

## AMATEUR TELEVISION MAGAZINE™ INTERNATIONAL

A Division Of QCD Publications, Inc.

"OFFICIAL JOURNAL OF THE  
UNITED STATES ATV SOCIETY"

"For the specialized communication radio amateur"

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April 1984 Volume 14 No. 4

# TAKE ONE

## A5 Editorial Comments

### "A5" Going South...

As we go to press with this issue, we are getting ready to head to the Charlotte, N.C. Hamfest. It is a big one and has had quite a reputation in past years for being one of the most enjoyable to attend. So far, I must admit, the "southern hospitality" has already begun with many of the local members extending all sorts of help to us in our trip preparations. Dr. John Fox WB2LLB/4 will be assisting us in the Saturday ATV program. On a slight side trip, we will also be visiting members of the South Carolina ATV Group as well. We shall report on these get-togethers, hopefully in our May issue.

### Dayton Cooperation Theme This Year...

We are delighted not to see the split Friday night SSTV get-together meetings at Dayton again this year. Some quiet, behind the scenes, cooperation is certain to make this year at Dayton a much more relaxed and enjoyable atmosphere. Note "A5" is at a new Dayton Booth location this year. We are in Booth #279 right next to Volker Wraase Electronics. This is in the nicer room just inside the Main Entrance. Stop by and say hello!

### Dayton FSTV "Live" Activities for 84!

Hey Fast Scanners, let's have some additional "fun" this year at Dayton! Pack up your FSTV transmitters, Downconverters, Amplifiers and Antennas and "rig" them up in your Hotel/Motel rooms. If your room is unsuitable, get permission to use the lobby! What a demo to other non-ATV hams, eh? Shoot for the Dayton W8BI ATV Repeater (vertical polarization) on 439.25 Mhz. IN/426.25 Mhz. OUT. Let's use their 147.450 Mhz. simplex "voice" talk channel for coordinating. An alternate voice channel can be 144.340 Mhz. (FM). Let's work HOTEL to HOTEL, MOTEL to MOTEL or even work those brave souls crazy enough to come on in with "MOBILE ATV" systems! These events will commence starting Thursday evening and running thru Sunday evening (for those that stay). Local ATV'ers from the Dayton area will be on-the-air also on Friday and Saturday evenings. "A5" will award the following prizes for these events; for those who are "received" (from HOTEL/MOTEL or out-of-town MOBILE systems) either into the Dayton W8BI ATV Repeater System or at our LA QUINTA ATV "Base" facility, we shall extend your "A5" susbscription by 1 year! See you at Dayton! -QCD









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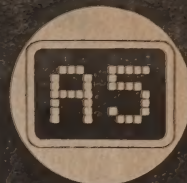


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# AMATEUR TV ON THE THE CANADIAN SCENE

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CQ  
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Attention "A5"  
Canadian  
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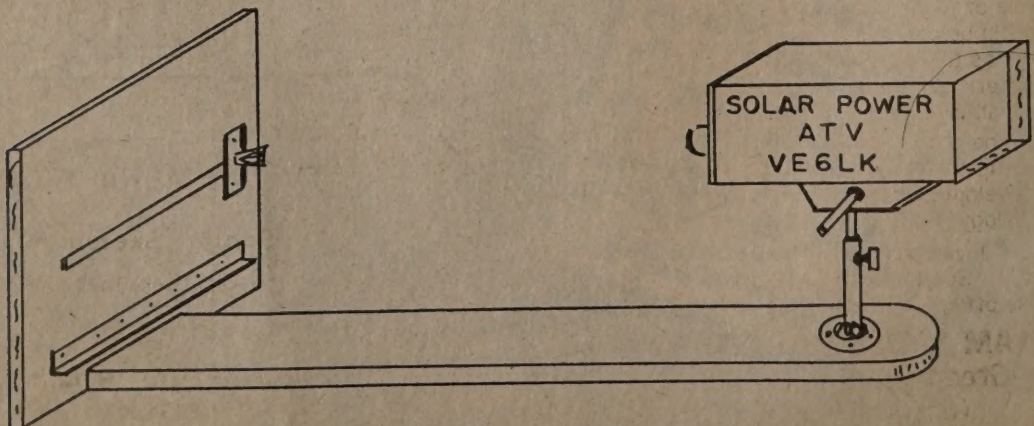
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## Cheap, easy to build, VE6LK ATV camera stand...

Enclosed are some ideas for "A5" readers on camera mounts for ATV. The base is a 1x5 board holding the picture holder at one end and the camera on the other. The assembled camera mount is shown on the lower bottom of page 2. The handle (Detail "D") is made from a bent, headless bolt of sufficient length. Detail "D" is tapped so that the handle threads into the hole. The lower part of Detail "A" is turned on a lathe and grooved to fit into the pipe (Detail "C"). The Knob (Detail "F") can be a Knurled Knob such as a thumb screw removed from the remains of a cheap C-clamp or from a small vice. The pipe (Detail "C") is a 1" O.D. pipe with threads on to fit into a regular pipe flange

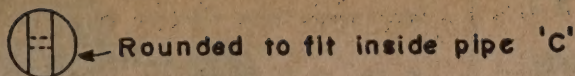
(Detail "B"). A nut is welded onto it, to accept the Knob of Detail "F". The top part is a short length of angle metal. The Knurled nut (Detail "G") must be threaded 1/4" x 20 NC to fit the camera. Other ideas to consider are: Weld a C-Clamp to the bottom of the pipe, so that the camera can be clamped to a desk or table top. The paper holder shown, can be obtained from an old teletype machine. Also, plastic plumbing will work very well instead of the pieces of iron, aluminum and brass that I used. Since the camera is able to swivel to other positions, live shows can be shown by simply turning the camera to the side. The above ideas are not copyrighted and I hope that they can be of use to other ATV'ers. 73's from CANADA! de VE6LK



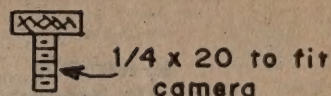
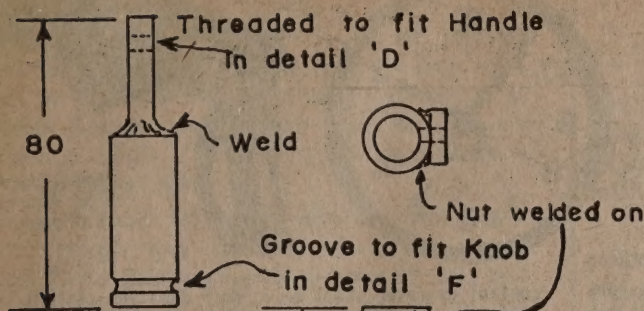
ATV Camera Stand (Simplified)

Channel 4

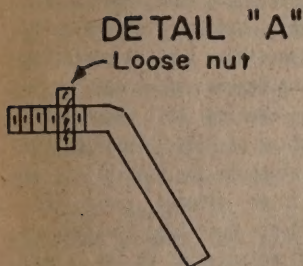
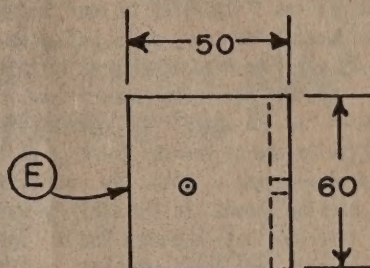




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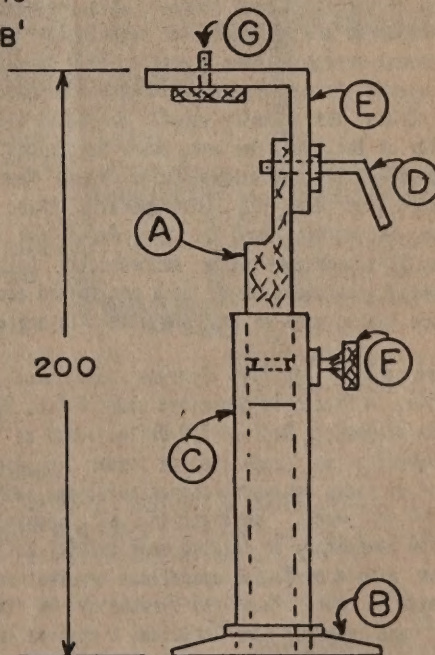


DETAIL "G"



DETAIL "D"

DETAIL "C"



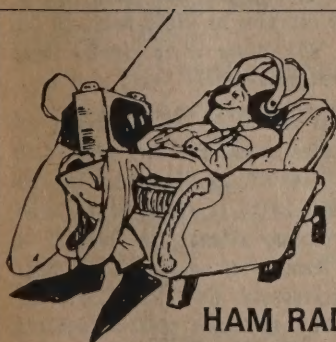
ATV CAMERA STAND

Scale = Sketch

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84/1/30

Drwn. by - Henry R. Anderson  
VE6LK



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# REMOTE CONTROL ATV!

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**Consider An ATV Beacon Type Remote Transmitter Project For Your Local Group**

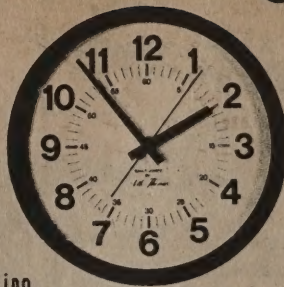
by WBØQCD  
A5 ATV Magazine

## PUT YOUR OWN SYSTEM TOGETHER!

How many times has it happened to you? You're working on your ATV Downconverter or just put up new low-loss hardline or maybe you have been working on installing a new FSTV antenna system or even worse- you have that prospective ATV'er "in the shack" to demonstrate to him some local activity and of course- there is no one around to transmit a picture signal. Most ATV activity appears after normal working hours in the early or late evening which leaves little for those who work 2nd or 3rd shifts. You need a "friend" out there somewhere in ATV land who will always be there, at your command, when you need it.

Not all areas are fortunate (or unfortunate depending on your views) enough to have a working FSTV Repeater. The differing viewpoints concerning "ATV Repeaters" is felt strongly across the country usually dependent literally upon the lay of the land. One area where both sides seem to agree, however, is on Automatically Keyed Remote Site Amateur Television (AKRS ATV). An operator keyed remote transmitter is nothing new to Ham Radio nor Amateur Television. It's been done quite successfully before. It seems, however, it just hasn't been publicized about very much. We are taking care of that now with this article.

Specifically, true ATV Beacons operations remain questionable. A Beacon is described under F.C.C. Rules and Regulations on Amateur Radio (97.3 Definitions) as "one-way radio communication conducted in order to facilitate measurement of radio equipment characteristics, adjustment of radio equipment, observation of propagation or transmission phenomena, or related experimental activities." Limitations placed on Beacon operations are that no Beacon may transmit in more than one frequency in the same frequency band from the same location, a station in beacon operation, either locally controlled or remotely controlled, may also be operated by automatic control when devices have been installed and procedures have been implemented to ensure compliance with the rules when the duty control operator is not present at a control point of a station. There are also some necessary requirements for an Amateur Radio Remote Control Station (97.88); An Amateur Radio Station may be operated by remote control only if there is compliance with the following: A photocopy of the remotely controlled station license shall be posted in a conspicuous place at the remotely controlled transmitter location with the name, address and telephone number of at least one control operator should one need to get a hold of them. Except under operation of automatic control, a



"Send Your ATV Video Articles to A5 today!"

control operator shall be on duty when the station is being remotely controlled.

"A5" spoke with FCC Engineer Steve Lett about a year and a half ago concerning this matter, specifically directed toward ATV transmissions. Many various confusing subjects were discussed concerning beacons and automatic or remote controlled operations. During this hour long telephone conversation, the question of FSTV IDENTIFICATION was brought up once again in relation to the possibility of recognizing Video only ID'ING with or without audio (For years, many ATV'ers + ATV Repeater's have been identifying on a 4.5MHz audio subcarrier- but not actually on the video carrier- and many do not use subcarrier FM modulated sound and needed to identify "on-carrier" . We mention this ID subject only in passing as this subject was taken care of by the recent FCC Part 97.84 decision on VIDEO only ID'ing (RTTY also) in August (see "A5" Volume 13 #8 issue). (Gee, I wondered what triggered that response?).

The FCC also recently came out with an expansion of Amateur Radio beacon frequencies around February 1983 which covered partial portions with the ATV 70 CM band. In our discussions with FCC Engineer Lett, it simply boiled down to this; the FCC would frown on any attempt to install a UHF wideband signal ATV transmitter on the 420-450 MHz. band that was keyed up continuously all the time. The premise behind the remark was that common sense recognized that the 420-450 Mhz. band is "shared" by many mode users and Amateur Services (SSB-DX, ATV, Satellite and FM) in which such a signal could possibly cause interference. The "key" to the conversation, however, was in the fact that a "remotely-controlled" ATV Transmitter Station, turned on for short periods of time, would be of no foreseeable problem.

Amateur Radio Television operators of the Illinois-Iowa ATV Group (ILLIOWA) in the Quad-Cities (Davenport, Bettendorf, Rock Island and Moline) have been operating such a "remotely controlled ATV Transmitter" station on 427.25 MHz. with the call letters N9CAI for about 8 months now. They are using a SILVERMAIL 18-Watt Transmitter (enclosed 1984 Bud box), a MICROWAVE MODULES MML-432 50 Watt Amp, 7/8" 50 Ohm Andrews hardline and a SEMCON T-432 Omni-directional, horizontally polarized turnstile antenna atop a 3 story school communications building on the campus of ST. AMBROSE College. Range (about

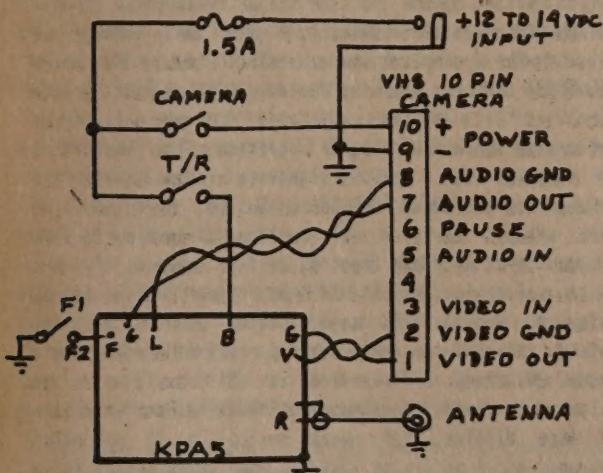


20 watts average on the BIRD) has been at P-3 to P-4 quality 30-35 miles away very reliably under normal VHF band conditions. It has been very convenient to be able to bring up the remote system at will any time of day or night. The N9CA1 REMOTE ATV TRANSMITTER can be brought up by touch-tone numbers 1-4-2-7 (427 MHz) on the local two meter ATV Coordination frequency of 144.340 MHz (FM/SSB). The system uses a special digital IC, interface card which recognizes the audio tone pulses and immediately keys up AC voltage which turns on several power supplies, the ATV Transmitter, a single light and a CCTV Camera which is focused on the subject matter.

First tests used 'A5' test patterns, with member alternating designs each month for awhile. Then a small Radio Shack Quartz Clock was mounted with one of the test patterns surrounding it much to the delight of all "viewers". The remotely controlled ATV Beacon not only provided the service of being there with a test signal, but served the purpose of informing the correct time as well. What was unique in the "clock" design was the "live" motion of the time piece "hands" especially the quick moving second hand. Further advancements to be done this spring (in warmer weather) are more power (100 watts), motorized rotation and perhaps indoor or outdoor viewing.

"A5" would like to get some actual working circuits published on touch tone decoders that can trip up AC or DC Voltages that could be used for ATV applications. If you know of any, please send them to us and tell us where they came from and who designed them. Let's hear from you "A5" readers and keep this simple ATV remote transmit station idea going! WB0QCD

#### P.C. KPA5-1 KEEPIE PEEPIE Hookup



An interesting, low-power ATV Remote Controlled Transmitter could be assembled from P.C. ELECTRONICS new KPA5-1 1-watt 70 cm. "Kreepie Peepie" unit (See P.C. "A5" Ads). In a weather proof container, such a device could be interfaced to a CCTV camera and mounted remotely at a high location for all to see and monitor UHF band propagation patterns or to watch over a repeater site or inside distant transmitter areas. See the P.C. ELECTRONICS KPA5-1 "Kreepie Peepie" schematic diagram published in this issue on Channel 27.

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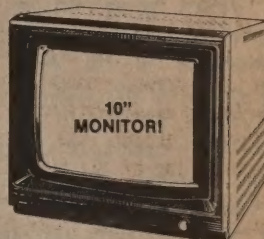
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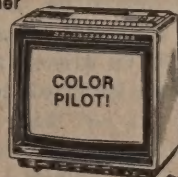
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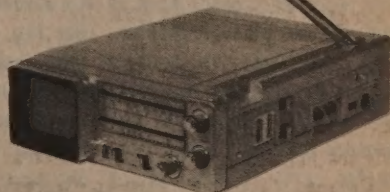
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# USING A WAVEFORM MONITOR FOR AMATEUR TELEVISION

A Few Basic Pointers  
Every FSTV'er Should Know!

Written For A5 ATV Magazine  
by Mike Veldman WD8CTA



A majority of Hams involved in non-broadcast video tape production or ATV transmissions do not use test equipment to monitor their video signals as it is being recorded or aired, nor do they test it after it is played back or received. The major reason for not employing test equipment was the belief that you couldn't afford a waveform monitor, or that you had to be a video technician to use one. That falacy can quickly be disposed by the fact that new inexpensive waveform monitors are now available, and many used ones seem to be showing up at flea markets and ham fests. With this kind of availability it is now possible for even the low budget ATV'er to monitor his video signal whether on location or in the shack, to be sure it is of sufficient quality.

Before going further, we should define a few terms. A waveform monitor is a measuring device that when properly connected to the output of a camera, VCR, or receiver displays various component parts of a video signal on a CRT (Cathode Ray Tube) or screen. It is used not only to monitor a camera, or a recorder in operation, or to look at your signal before it's transmitted and after it's received, but also to set up the camera by running through a series of tests and checking the waveform monitor to see that the signals displayed match the standard waveforms.

A waveform monitor however, is just that - a monitor! It is not usually considered a piece of "test equipment" since it is not used to test individual points when tracking down a problem the way, for example, an Oscilloscope is used. The first thing to learn is how to hook the waveform monitor into your system correctly. Instead of having a cable running directly from the camera to the recorder or transmitter, run it out of the camera, into the waveform monitor, then out of the monitor into the transmitter or video tape recorder. This set-up allows you to check the signal as it leaves the camera, but before it is aired or recorded. (See Fig. 1). If you want to check your recorded signal, hook up the waveform monitor between your VCR and picture monitor. (See Fig. 2).

If you want to check the wave-shapes of your incoming off the air signal, you just hook the waveform monitor to a Demod video output on your receiver and terminate the waveform monitor output. If you don't have a receiver monitor with a Demod output, but have a VCR, hook the ATV receive converter into the RF input of the VCR, and the waveform monitor to the tuner output. (See Fig. 3). Since most waveform monitors have two separate inputs, you can monitor at least two different sources such as transmit and received, or two cameras, etc. Switchable inputs present a multitude of combinations. Some monitors also have an A+B mode which allows you to superimpose one wave-shape on another for comparison or alignment.

Now that we have discussed the possible ways to use the waveform monitor in your ATV station, let's take a closer look at the waveform monitor itself. The inputs for most monitors are usually on the back panel labeled A and B. The inputs are usually in pairs to provide loop through capability. Usually included on the back panel is an external sync input. This is used in larger television systems to make comparisons to house sync reference. Sometimes you will find either three separate jacks or one multi-pin connector, labeled R.G.B. for un-encoded color signal inputs. Some waveform monitors have a selector output jack which allows you to monitor with either a picture monitor, or additional test monitoring equipment, which ever is selected by the selector.

Now that you have the waveform monitor hooked into your ATV station, let's see what the various knobs and switches on the front panel are for. **VARIABLE (Volts Full Scale) CONTROL:** Continuously variable control with a minimum range of 1 to 4 to permit variable adjustment of gain for each Volts Full Scale switch position. Used in conjunction with the Volts Full Scale switch to accommodate input signals from 0.25 volts to 4 volts. **RESPONSE SWITCH:** Four position switch selects Flat, Ire, or Chroma frequency response characteristics. A fourth position, Diff Gain, provides the same frequency response as the Chroma position but with an additional gain of 3X to 5.5X. **INTENSITY CONTROL:** Controls brightness of the display. **POWER SCALE ILLUMINATION CONTROL:** Power switch turns instrument on or off. Scale Illum control sets light level of graticule markings. **FOCUS CONTROL:** Permits adjustment of CRT beam for optimum definition. **POSITION (Vertical) CONTROL:** Vertically positions the display. **SYNC SWITCH:** Two position slide switch to select Int or Ext sync. **DC RESTORER SWITCH:** Two position slide switch to turn the DC restorer On or Off. **POSITION (Horizontal) CONTROL:** A ten turn control to position the display horizontally. **CAL AND UNCAL INDICATORS:** Indicate when the Variable (Volts Full Scale) control is set to the calibrated (Cal green light) or uncalibrated (Uncal red light) position. The indicators also function as a pilot light to indicate when the instrument is on. **VOLTS FULL SCALE SWITCH:** Five position switch selects the full scale vertical deflection factors for Video Input A, Video Input B, or the internal 1V Cal (1volt) calibrator signal. **2V MAG:** Expands the two fields display to provide 20X magnification of the vertical blanking interval or any other portion of the two-field display. **2V:** Sweep of repetition is half field rate to display two fields (one frame). **1H SWITCH:** Enables 2 line or 1 line display when sweep switch is in uppermost position, and 1 us/Div or .5us/Div when sweep switch is in 2nd uppermost position. **ASTIGMATISM ADJUSTMENT:** Screwdriver adjustment permits adjustment of the CRT beam for optimum definition when used in conjunction with the Focus control. **TRACE ALIGN ADJUSTMENT:** Screwdriver adjustment to align the trace or the display with the horizontal graticule lines. **SWEEP SWITCH:** Four position selects 2H, 1us/Div, 2V Mag and 2V sweep rates. **2H:** Sweep repetition is half line rate to display two television lines. **1 us/DIV:** Expands the two-line display to provide 10X magnification of the horizontal blanking interval or any other portion of the two-line display. All of the control functions previously



listed are for a Videotek TSM-5, but are the same or very similar to almost all other waveform monitors.

Our next step is to turn on the waveform monitor and take a look at a portion of the incoming video signal. You may have to adjust the vertical and horizontal controls, but you probably won't have to touch any of the others. If you are using a camera as your video source for this test, it should be turned on and operating, but keep the lens capped or the Iris closed down.

There are actually many components of a television signal, each with its own name. Before looking for problems in the video signal, you should be familiar with each of these various names. The diagram in Figure 4 shows the video wave shapes as it is seen on the face of the monitor. Labeled in this diagram are all the component parts of the television wave shape, ie. blanking width, front porch, sync, breezeway, burst, and back porch. Distortion in any of these various portions of the video signal would indicate a problem. If you would like the signal from your camera to look like the diagram in Figure 4, you will need to zoom in on an all white card so that the image fills the picture monitor screen, then light the card or adjust the iris so that the wave shape rises to 100 units. Apart from looking at the overall sync signal (actually you are checking the timing signal). You can check for such things as the video level, the black level, white balance, encoding, sync level, and burst. These are the main signals you may want to check before the transmission or recording begins.

Just as an experiment, one additional signal component you might want to check is blanking. FCC regulations for broadcast standards specify maximum horizontal and vertical blanking widths as 21 lines for vertical, and 11.4 microseconds for horizontal. Even though your signals are not considered as broadcast, you might want to conform to these standards..just because. Shown in the diagram in Figure 5, is what vertical blanking looks like on the monitor. As you can see, 20 of the 21 vertical pulses are blanked. Actually, the numbers given are the maximum the FCC permits at the time of broadcast transmission. Your blanking widths would, or should be less, because both horizontal and vertical widths will increase if recorded or processed for transmission. Undoubtedly the best use you can make of a waveform monitor, is to verify the integrity of your transmitted or received video. This has been a brief insight into the waveform monitor. If you can obtain one, they're nice to have around the shack.

For more information on uses, please try to consult some of the references at the end of this article. REFERENCES: The XYZ's of Using a Scope, Tektronix; Video Techniques, White; Television Broadcasting Systems Maintenance, Ennes; Television Broadcasting Equipment Systems Operating Fundamentals, Ennes; and Cable Television Second Edition, John E. Cunningham. 73's Mike WDOCTA.

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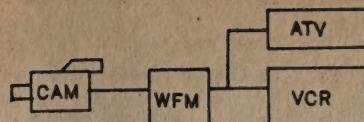


FIG. 1

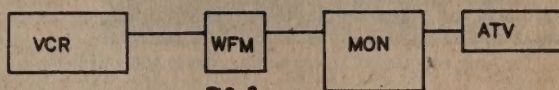


FIG. 2

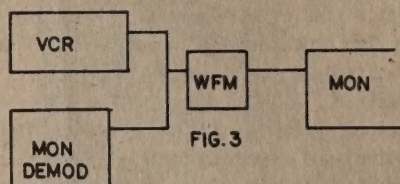


FIG. 3

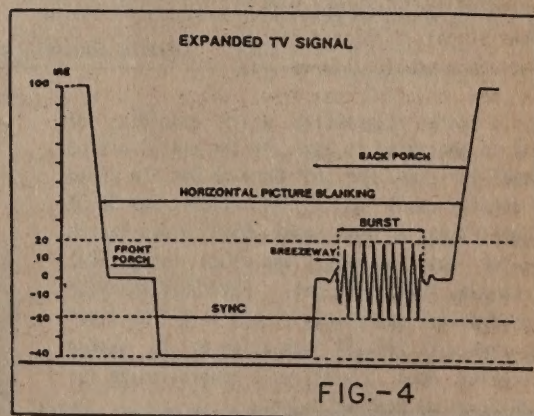


FIG.-4

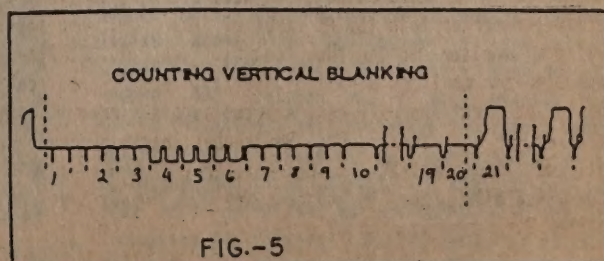
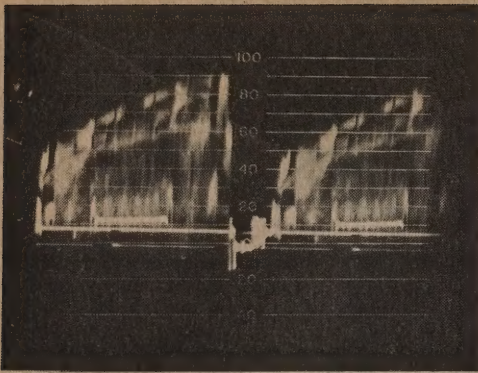
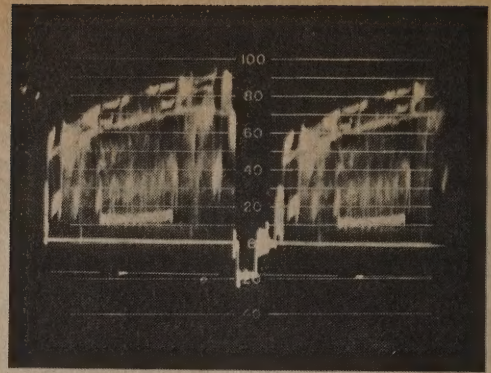


FIG.-5

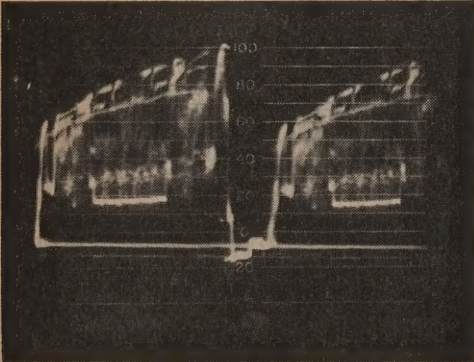




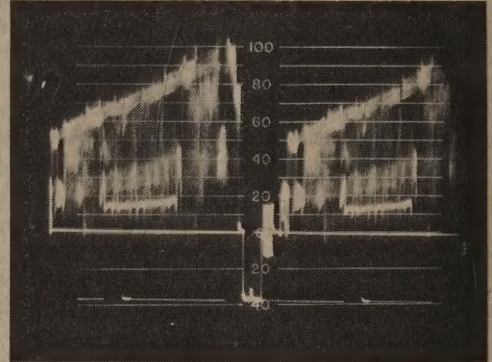
Shown here: The amp was tuned for maximum power out, but look at the sync pulse!



Sync compression is shown here from trying to tune the amp for that extra watt of power. What you think you gain in power you lose in the ability for your picture to lock up under weak signal condition.



Believe it or not this produced a picture. Shown here is what happens when the amp is tuned on the wrong sideband, notice the sync pulse and color burst signals are gone and overall quality of this picture was poor.



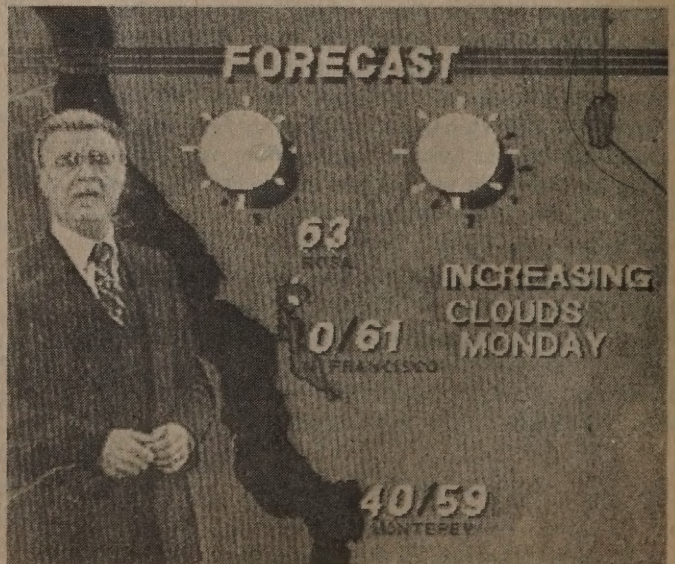
A correct video waveform showing the 0 line or blanking level, the sync pulse, color burst and video information from 0 to 100 10 being reference black and 100 being reference white.

(Photo courtesy of Dave Williams WBO2JP)

There is a very interesting story unfolding of recent that is beginning to have all the potentials of a "James Bond" thriller! Our "A5" Foreign Rep. in Japan (JG1DDT) recently sent us a FAX article from CQ-JA Magazine depicting a new model P50U Video-Snatch HI-RES Printer that accepts 1 vpp VIDEO inputs (RCA) from any Camera, VCR, TV Set, FSTV/SSTV/FAX/RTTY Converter or Computer and prints it out in a "FAX like" 4"x4" photograph with 280X234 resolution by 16 shades of grey levels! Such a unit, will revolutionize the printer industry as we know it today.

A5/USATVS Member Greg Mengell KA6DPV called us about the same item, verifying what we had heard from Japan, as he actually purchased one of the unique units from an apparent test market store in California. We were able to contact this store, obtained a couple units for ourselves, only to learn that the big AT&T conglomerate supposedly contracted some 200,000 of the P50U units and is attempting to block Retail distribution here in the U.S.A. market. "A5" ran into a wall of denials from a Los Angeles 800 number Mitsubishi location as to even the manufacture of the product let alone comment on the questionable marketing suppression. To the right is an untouched photograph snatched off of a TV/Monitor. We will bring this unit to Dayton at our booth and will keep you all advised.

## MITSUBISHI RELEASES REVOLUTIONARY NEW "VIDEO" INPUT HI-RESOLUTION PHOTO PRINTER! U.S.A. Retail Market Questionable?



Channel 10

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# Turn a few hours work into years of fun with Amateur Television.



## ATV-2

**\$59.95**

### ATV Converter\*

The new ATV-2 converter has two super sensitive RF Pre-amplifier stages using the low noise MRF-901 (1.7 dB NF) transistors. The ATV-2 tunes from 420-450 MHz and down converts to channels 2, 3, or 4 on your standard TV set. The circuit uses durable microstrip design for stability and simplicity. The combination of a dual RF stage, the microstrip design, and the hot-carrier diode double-balanced mixer reduces UHF TV intermod problems. The local oscillator is varactor controlled for ease of tuning. An additional feature not found on other ATV downconverters is the incorporation of a post amplifier stage (6 dB min gain) following the double-balanced mixer. This post amplifier stage is used to overcome the conversion loss of the mixer. The Post-amplifier also delivers a signal level that is acceptable to the TV set to overcome the TV set's sensitivity threshold. The addition of the Post-amplifier circuitry is most noticeable on every weak signal reception. Overall the Communication Concepts ATV-2 downconverter is just what you need to enjoy amateur television to the fullest extent.

#### ATV CONVERTER:

|  |              |
|--|--------------|
| ATV-2-Wired and Tested.....            | \$59.95 each |
| ATV-2-Pk Partial Kit.....              | \$44.95 each |
| ATV-2-PCB Printed Circuit Bd only..... | \$10.00 each |
| ATV-2-I Instruction Manual Only.....   | \$5.00 each  |

#### Specifications

|                        |                     |
|------------------------|---------------------|
| RF Input.....          | 420-450 MHz         |
| RF Output.....         | Channels 2, 3, or 4 |
| DC Input.....          | +12 Vdc at 50 ma    |
| RF Stages.....         | 2 (MRF-901)         |
| LO.....                | Varactor Tuned      |
| Fine Tuning Range..... | Approx. 30 MHz      |
| Pre IF Stage Gain..... | 6 dB Minimum        |

### Audio Squelch Control

You have a squelch on your 2 meter equipment; why not add a squelch to your ATV monitor. Now you can avoid the major problem of operating ATV—the annoying hiss and static when the signal is not present. With the ATV squelch, you no longer have to turn the volume down when the signal disappears and risk the chance of missing a signal.

The squelch easily connects to the TV receiver audio stage without modification of the TV, since the squelch circuit contains its own audio output stage. You must provide your own speaker. Operator safety is provided by using transformer isolation between the receiver and the squelch circuit, thus eliminating the shock hazard when using a "hot chassis" type TV receiver.

**\$34.95**



**SIL-K** Complete Kit—includes a detailed instruction manual, printed circuit board and all electrical components. Kit does not include case, speaker and regulated power supply (10 to 15 volts @ 250mA)

**SIL-PCB** Printed circuit board only **\$10.00**

### 100 Watt Linear Amplifier

Now you can get on the air with a high power 100 watt class B linear amplifier for SSB-FM or ATV on the 420 to 450 MHz band and still not spend a lot. This kit is described in Motorola engineering bulletin EB-67 and is available in a number of configurations. For full output, a minimum of 16 watts is required for excitation with an input SWR of not higher than 2:1. Output will maintain stability with a 3:1 collector mismatch at all phase angles. A designed-in low-pass filter suppresses the 2nd harmonic to at least 63 dB down. An external power supply capable of providing 28 VDC, regulated, at 10 amps is also required.

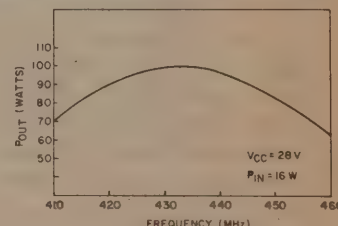
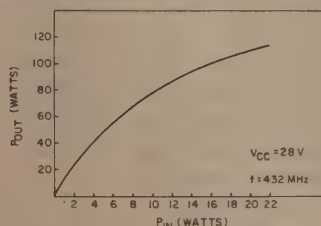


**\$119.95**

**KEB-67-PK** Kit includes detailed step-by-step instructions, printed circuit board, and all electronic components as shown.

**KEB-67-PCB** Printed circuit board only **\$14.00**

**KEB-67-I** Instruction manual only **\$5.00**



## P.C. Boards

The FCC does not allow us to sell Broadband RF amplifier kits in the HF range, therefore we can only offer the printed circuit board and parts on a piece-by-piece basis.

140 watt power amplifier as described in Motorola engineering bulletin EB-63. **EB-63-PCB**

100-180 watt power amplifier as described in Motorola application note, AN-762. **AN-762 PCB**

300 watt power amplifier as described in Motorola engineering bulletin EB-27A. **EB-27A PCB**

Transformers, transistors and other parts are also available.

## We also specialize in hard-to-find components.

In addition to our kits, we also stock parts for other Motorola application notes and engineering bulletins. We have an in-depth stock of Motorola VHF and UHF transistors, Underwood metal clad mica capacitors (Unelco), Kemet chip capacitors, Cambion RF chokes and Ferroxcube Ferrite beads and RF chokes plus other difficult to find parts. If you are having trouble finding a part, call us, we probably have it in stock.

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Channel 11





# PROC-AMP 1 ATV CIRCUIT BOARD

by U.S.A.T.V.S. Member  
Hap Griffin WA4UMU  
Sumter, South Carolina 29150

EXTEND YOUR ATV VIDEO DX RANGE EVEN MORE!

EDITORS NOTE- USATVS Members will be hearing quite a bit from Hap Griffin WA4UMU in future issues of "AS"! He is going to produce a whole line of FSTV Video related circuits. He is employed by the South Carolina Educational TV Network since 1978 working in both production and transmission engineering. His current position with the system is a transmitter supervisor at WRJA-TV and FM in Sumter. WA4UMU has been active in Amateur Radio for 8 years and an avid ATV'er since 1978. He also has interest in RTTY, SSTV and MARS and is trustee of a local 2 Meter FM Repeater which is sponsored by a 68 member club. He also enjoys Photography, Music, Astronomy and Computers. QCD

GRIFFIN ENTERPRISES (P.O. Box 6104, Sumter, South Carolina 29150) announces the availability of it's first Accessory Board for ATV. The unit is called the "Proc-Amp 1", which anyone in the commercial television field knows stands for "Video Processing Amplifier." This is only the first of a series of modules designed to expand and upgrade your FSTV station. The line will include video and audio switchers, distribution amplifiers, test pattern generators, sync generators and other accessories to make your operations and video productions look "just like the professionals."

The "Proc-Amp 1" is designed to go in the video input line to your ATV transmitter. It has separate video and sync gain controls, which allow you to set the video/sync ratio to meet any demand. It can be used to remedy sync compression (see below), boost the video from an aging camera, and stabilize the picture from VTR's with insufficient sync output. Since the video and sync gain controls are independent of one another and the sync does not disappear when the video is turned down, the "Proc-Amp 1" can be used to build a video fader for more professional looking productions.

Perhaps the area where this unit finds itself to be most useful is the compensation for sync compression. Have you ever had to back off on your power output to be able to transmit a decent 100/40 video/sync ratio? Have you ever had a distant station tell you that you were just on the edge of snow, so you raised your power a bit, only to have his receiver unlock because of insufficient sync from your transmitter? The problem here is that all amplifiers are non-linear. Some much more than others. This means that as you raise the drive to your final amplifier stage, it takes more and more input power to produce a corresponding rise in output power. This shows up as compression of your highest power peaks, which are the sync pulses. On the receiving end, the picture becomes jittery, and if the sync compression is severe, the picture unlocks. The industry standard is 40 units of sync for 100 units of video and this ratio is what the TV receiver's sync and automatic gain control circuits are looking for.

Most ATV transmitters on the market have some form of sync expansion built in. This is usually in the form of a circuit which pulls up the voltage supplied to the final amplifier stage only during the sync time. This method has a limited range of operation... and what about those of us with homebrew or older gear with no provision at all for sync stretching? This was the primary drive behind the development of the "Proc-Amp 1".

With a standard 1 volt video input signal (0.715 volts video and 0.285 volts sync), the sync can be expanded to 2 volts or more. That should take care of any possible case of sync compression. With that out of your way, you can now turn the power up on your rig for that all out DX attempt, knowing that your video-to-sync ratio is what it should be. In addition, you can boost the picture information up to 2 volts if need be, or reduce it down to zero for fancy fade-outs without loss of sync. Speaking of sync again, your pulses are digitally regenerated so they come out with a near perfect square wave form.

The "Proc-Amp 1", as well as all future boards from Griffin Enterprises, will be sold in kit or assembled form. It is up to you to supply the power supply and/or case. The boards use a standard 22/44 pin edge connector. However, holes are provided for soldering if you elect not to use a connector. A standard power and grounding scheme is used to provide easy construction in a card cage format, if desired. Where possible, standard parts are used so that replacements can be found at most Radio Shack stores.

Griffin Enterprises is dedicated to the promotion and further development of the specialized modes of Ham Communications.

## Introducing The New PROC-AMP 1

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GRIFFIN ENTERPRISES

Are you plagued by Sync Compression in your FSTV system? Would you like to do fancy video fadeouts without loss of sync lock? Would you like complete control of the video levels in your VTR or TVRO setup? The new 'PROC-AMP 1' is designed to give you independent control of the video and sync levels with any FSTV, TVRO or video production system and can be installed into existing equipment as well as built into a free standing unit. Requires standard composite video input and 12-15 vdc @ 50 ma.

Board and Parts Kit ..... \$25.00  
Assembled and Tested Board ..... \$35.00

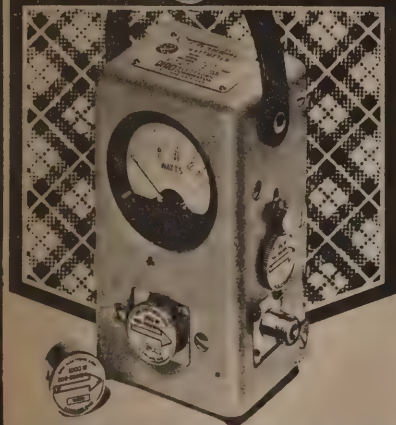
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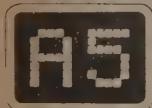
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## DESIGN EVOLUTION IN RF P.A.'s



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(See review in December '83 "A5")

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|---------|-------------|--------------|-------------|---------------------|
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| 1410G   | 144         | 160          | 30          | 265                 |
| 1412    | 144         | 160          | 30          | 199                 |
| 1412G   | 144         | 160          | 30          | 239                 |
| 2210    | 220         | 130          | 10          | 225                 |
| 2210G   | 220         | 130          | 30          | 265                 |
| 2212    | 220         | 130          | 30          | 199                 |
| 2212G   | 220         | 130          | 30          | 239                 |
| 4410    | 440         | 100          | 10          | 225                 |
| 4410G   | 440         | 100          | 30          | 265                 |
| 4412    | 440         | 100          | 30          | 199                 |
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1. Models with G suffix have GaAs FET preamps. Non-G suffix units have no preamp.
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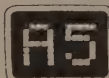
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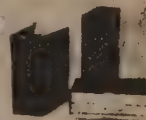
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How to use a waveform monitor and vectorscope to be sure your system is producing a completely acceptable video signal. A must read "A5" Technical Article for all USATVS Members!

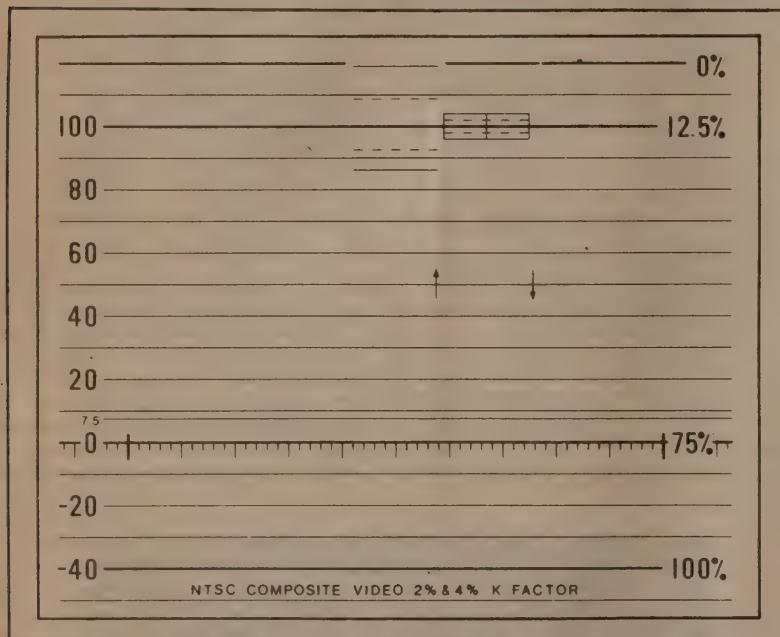
# MEASURING A TV SYSTEM

• ETV • OCTOBER • 1983

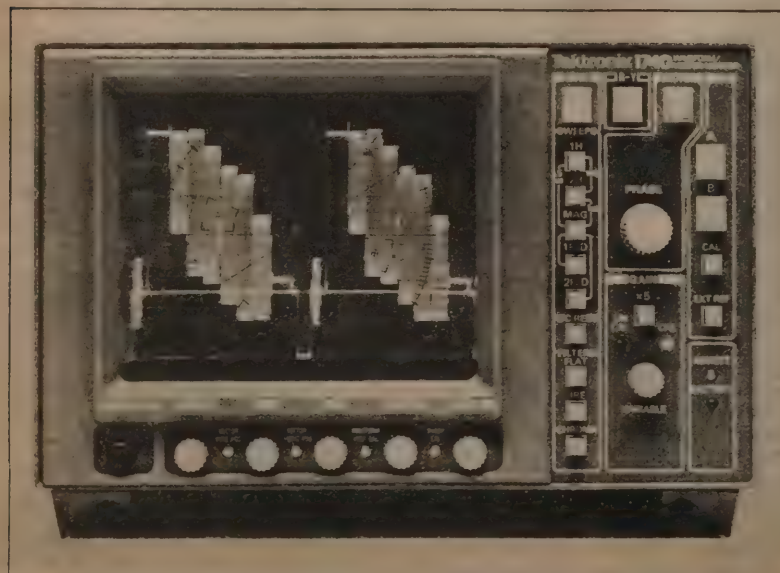
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Above: Figure 1, a diagram of the graticule on an NTSC waveform monitor. Note the scale in IRE units at the left, from -40 to 100, with the timing measurements along the 0 blanking level and the 7.5 set-up level indicated. Below: Figure 2, the front panel of the Tektronix 1740, showing all the control buttons. This is a new unit that can display both a waveform or a vector on the same CRT, which has both graticules engraved on it. The trace displayed is of color bars in the 2H mode.



**B**EFORE DISCUSSING the actual measurements used for a television system, let us review some of the basic structure of the NTSC System M. This system is comprised of a series of horizontal scanning lines which are arranged in an interlaced pattern of 525 scanning lines per frame. There are 30 frames per second generated under this scheme. Since all picture information is referenced to the horizontal (H) rate, it is necessary to understand some of the basics of amplitude and timing measurements.

To start with, let us consider what IRE (Institute of Radio Engineers) units are *vis a vis* actual voltage values. IRE units are relative units of measurement, not absolutes like voltages. As we can see in the accompanying diagram, the graticule on a waveform monitor expresses this relative measurement in terms of IRE units, and provides certain benchmarks (see Figure 1, the diagram of the waveform graticule).

Beginning with the benchmark of 0 reference, referred to as blanking, and going in a positive direction (up), we see that the video level presented on a waveform monitor ranges from 0 to 100 IRE units, with a set-up level of 7.5 IRE. The timing (sync) information is in a negative direction from blanking (down), with a peak amplitude of -40 IRE units.

Subcarrier reference information, which is found in the horizontal blanking interval, has an overall amplitude of 40 IRE units peak-to-peak, and is centered about the 0 IRE level. Note that this is the same peak-to-peak amplitude as sync. If we express the IRE units in terms of voltage, the relationship is as follows: 100 IRE units equal 0.714 volts and ten IRE units equal 0.0714 volts. If we examine the composite video signal, we will find the usable television picture information extends from 0 to 100 IRE, which is equal to 0.714 volts, and the sync amplitude extends from 0 to -40 IRE, which equals 0.286 volts. The overall amplitude of the video waveform, therefore, is 1 volt peak-to-peak, or 140 IRE units.

William W. Montgomery is the senior sales engineer for television products at the Irvine Field Office of Tektronix, Inc. This office serves the Los Angeles area; the company's headquarters are in Beaverton, Oregon.



The graticule on waveform monitors also expresses timing relationships. At the blanking, or 0, IRE level, measuring horizontally, 12.7 divisions are marked for making timing measurements with horizontal (line scan) or vertical (field scan) rate sweeps. The time measurement scale is selected by the front-panel buttons on the unit (see Figure 2, the row of buttons right of the CRT), labeled 1H, 2H, and 1FLD, 2FLD. You can also expand the time scale by selecting the sweep magnifier to obtain scales of 0.5 or 1.0 microseconds per division. Without magnification, this scale indicates measurements of about 5 microseconds per division in the 1H mode, and about 10 in the 2H mode, but magnification is necessary if you want to examine the horizontal blanking interval. The data there are not presented in sufficient detail for measurement in the normal 2H mode.

### The Waveform Monitor

What does the video waveform monitor measure? The waveform monitor measures timing and amplitude characteristics of both the luminance and chrominance information in the composite television waveform.

The waveform monitor has the ability to select one of two video inputs, A or B, plus an external reference signal which can be used for timing reference. You can select a display of one horizontal (H) line, which has a time period of 63.5 microseconds. A 2H display is available to display two horizontal lines, and, as stated previously, when in this mode and by using the sweep magnifier, you can measure the horizontal blanking interval for correct subcarrier and sync timing (see Figure 13, which shows the black burst signal displayed in this mode).

One- and two-field displays (1FLD and 2FLD) are available to examine the vertical blanking interval, which is usually

done in the 2FLD mode with about a 20X magnification. The vertical interval has horizontal equalization pulses, to insure proper interlace between the two fields of a frame, and vertical seriation pulses, which maintain picture stability by maintaining horizontal timing stability. There are also several lines which are not used for picture information, e.g., Line 21, used for closed captions for the hearing impaired. This piece of equipment also has a calibrator to verify instrument calibration.

This particular unit has three vertical response filters: 1) a flat response filter for complete bandwidth response of the base-band video signal from frequencies of about 15 kHz to more than 8 MHz, with both chrominance and luminance displayed; 2) an IRE filter that displays the luminance information and filters out the chrominance, and 3) a chrominance filter that displays the chrominance and filters out the luminance.

A selectable magnifier is available for expansion of horizontal timing information as well as another magnifier for expansion of vertical information. A dc restorer is available to clamp the vertical position of the video signal to an internal voltage reference which maintains the 0 IRE level. Dc must be restored to keep the waveform from moving vertically as the picture content changes. You may also turn this function off for measurements of hum or other low-frequency disturbances.

### The Vectorscope

What does a vectorscope really measure? It measures the color information in the composite signals—hue, which is determined by the phase relationship of the color signal relative to the subcarrier reference, and amplitude, which relates to color saturation. A vectorscope does not measure luminance information.

The selectable functions on the vectorscope are the inputs A and B, plus external

reference which may be used for phasing of two video sources in a production switcher. The vector mode will also display what is essentially luminance information from the horizontal sync pulse, and appears as a "figure 8" at the center of the display. An R-Y function is available to evaluate differential phase impairments. In this mode, two signals are used at right angles to each other, one on the R-Y (vertical) axis, the second on the B-Y (horizontal) axis. If there are no phasing problems, the display on the R-Y axis will remain stable when a signal is added on B-Y.

### Measuring the TV System

As a start, let us examine some of the test signals which will be required. First, there is the color-bar signal (see Figures 3 and 4) for determining phase and amplitude relationships to the subcarrier reference of the primary colors red, green, blue, and the complementary colors yellow, cyan, and magenta. If the vector display shows that the bright dots fall outside of the boxes marked on the graticule, the colors in the image will not be true. Similarly, if the waveform does not display the proper amplitudes, the colors will not be true. Dots which fall closer or farther from the center than they should on the vectorscope indicate a distortion in saturation, e.g., red will become pinker as the dot moves toward the center. Dots which miss the boxes in a clockwise or counterclockwise direction indicate a distortion of hue, e.g., red will be too orange or too purple.

Next, the multiburst signal (see Figure 5, but be aware that it shows a distorted waveform) is for determining frequency response characteristics of the system. It is generated as a white flag (the intense white line at the top, to the left of the sine waves) and six bursts of sine wave signals (burst packs) at frequencies of 0.5 MHz, 1 MHz, 2 MHz, 3 MHz, 3.58 MHz, and 4.2 MHz. Any deficiencies in frequency re-

Figure 3, a waveform display of color bars in the 2H mode. This is a normal display, with the bars at 75% amplitude and a 100% white reference.

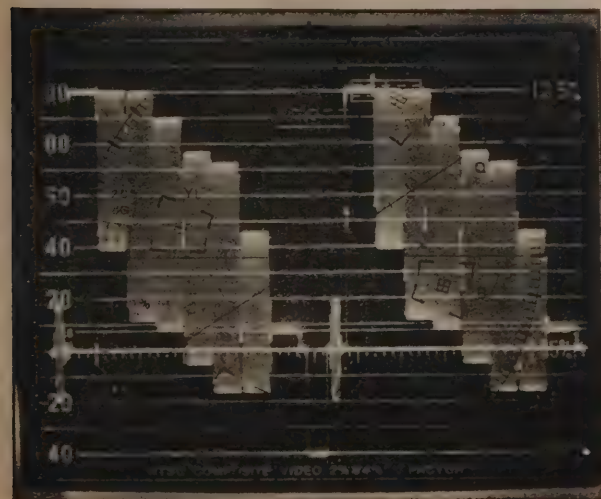


Figure 4, color bars in a vector display. Again, this is a normal display. The dots fall in their boxes. Note the "figure 8" (luminance) at the center.





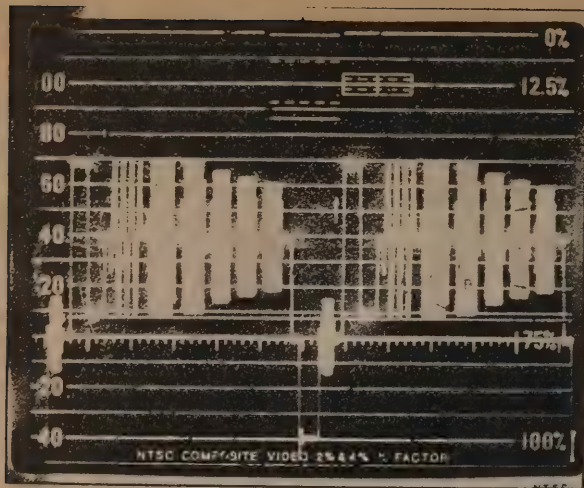


Figure 5, a multiburst waveform that displays high-frequency rolloff. The burst packs at the right have less amplitude than those at the left. Low-frequency rolloff would show diminished amplitude at the left.

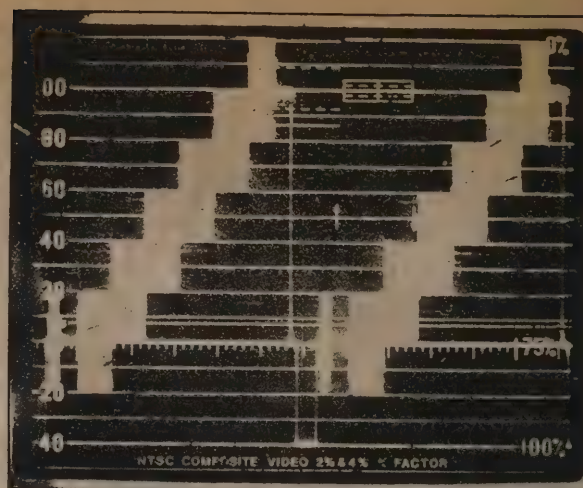


Figure 6, a modulated five-step staircase waveform. This is a normal trace—each step has a 40 IRE amplitude, and the sync pulse (center of the display) lies along the -40 IRE level.

sponse through the system will be indicated by peak-to-peak amplitude changes, i.e., one of more of the the burst packs will be taller or shorter than 7.5 to 70 IRE.

Modulated five-step staircase signals (see Figure 6, showing an undistorted display) are for determining such non-linear distortions as differential gain and differential phase. When these problems are present, the steps will be of uneven amplitude, usually decreasing as they ascend.

The window signal (see Figure 7) is for determining line time distortions. These distortions would cause variations in contrast on individual horizontal scanning lines—streaking, smearing, or ringing—which will effect sharpness and picture clarity. The window should be from 0 to 100 IRE, but this picture shows a display which falls about 4 IRE short of 100. Such

timing distortions can, for example, cause a flat, bright area in the picture to appear less bright at one side. The problem is usually present on several horizontal lines, thus becomes visible in the image displayed on a TV set.

The field square wave signal (see Figure 8) is a convenient way to test for inconsistencies in vertical contrast shading. This signal will indicate field tilt distortions due to low-frequency response problems or hum (as shown in Figure 9). Such distortions can cause the what should be horizontal edges on objects to run uphill or downhill, or it can cause a flat, bright area to look darker at the top or bottom. The horizontal and vertical distortions measured by these two displays interrelate—distortion of one will cause distortion in the other.

Vertical interval test signals (VITs) are test signals which are placed in the vertical interval of either field for in-service-type testing. VIT testing will not be covered in this article.

## TV Terminology

The important video terms which are common to actual operations are:

1. APL—The Average Picture Level of the luminance signal, averaged over one complete frame. There are test signal generators which will supply a signal at a specified (and selectable) APL.
2. Normalized Video—One volt of video peak-to-peak, as measured from the horizontal midpoint of sync tip, which

Figure 7, a composite signal with an insertion gain that is low by 4%. Had the gain been normal, the top bright white line would fall at 100 IRE.

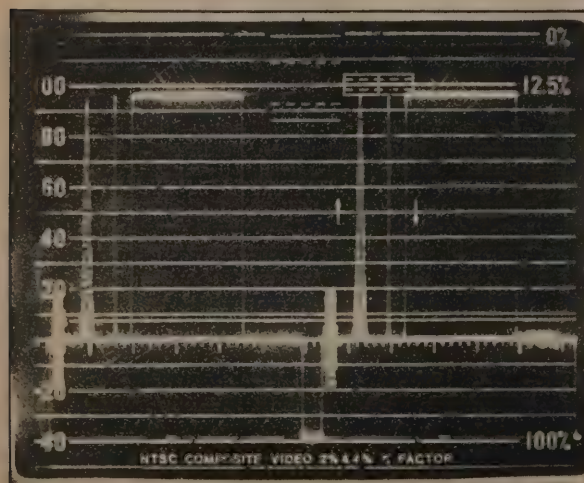
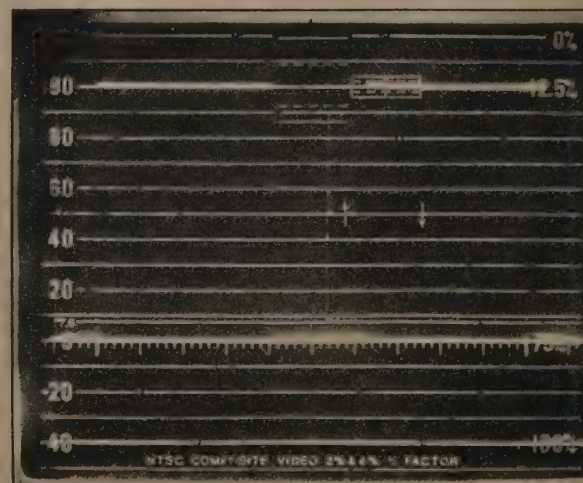


Figure 8, an undistorted field square wave showing no low-frequency response problems. Compare this to Figure 9 at the top of the next page.





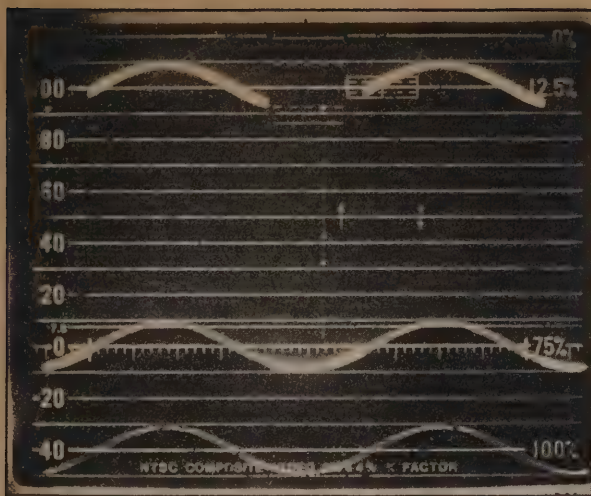


Figure 9, a field square wave that shows rather severe distortion due to low-frequency response problems, hum in this case.

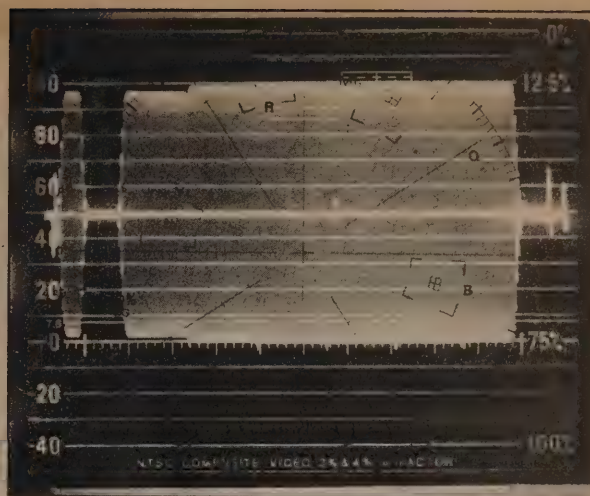


Figure 10, a modulated staircase through the chroma filter that shows differential gain distortion. Note the uneven steps at the left.

should fall at -40 IRE, to the midpoint of white bar, which should fall at 100 IRE, when the signal is terminated into 75 ohms.

**3. Unity Gain**—A 1-volt video signal output from a device that has had a 1-volt signal input to it, with the signal terminated into 75 ohms, i.e., no change in voltage because of passing through a piece of equipment.

**4. Insertion Gain and Loss** (see Figure 7, the window display) — Gains or losses from the normal video amplitude, which must be 1 volt peak-to-peak into a 75 ohm termination resistor. To determine insertion gain/loss, you can use the 100% white bar of the color bar signal, the multiburst 100% flag, or the window pattern signal. Insertion gain is expressed in terms of percentage of change in the video signal from 100 IRE units. In Figure 7, the loss is 4 IRE units (the difference between 96 and 100), or 4%. Had the display exhibited a level of 104 IRE, the percentage would be the same, but it would indicate gain rather than loss. In visual terms, loss results in an image that is too dark, gain in one that is too bright.

**5. Frequency Response** (see the multiburst test display in Figure 5) — The ability of the television system to respond uniformly to bursts of frequencies from 0.5 MHz to 4.2 MHz. Any loss in frequency response will be displayed as an amplitude (height) change of the burst packs.

**6. Differential Gain** (see Figure 10) — This is measured with a five-step modulated staircase signal, and is defined as the change in subcarrier amplitude caused by changes in the luminance amplitude. This implies that one must examine differential gain errors while submitting the system to changes in average picture lev-

els (APL) by using a test signal generator. Typically, this is done by putting the staircase on a specific horizontal line and measuring other lines against it by bouncing the signal or switching portions of the signal from 0 IRE units to 100 IRE units. Readings for differential gain are then taken for the worst case of APL change. This is monitored by the waveform monitor in the chrominance filter mode with 1H sweep.

**7. Differential Phase** (see Figure 11) — This is measured with a modulated five-step staircase signal displayed as a vector, and is defined as changes in chroma signal phase caused by changes in luminance amplitude. You can also make this measurement in the R-Y mode. Like differential gain, APL changes are required to exercise the system.

**8. Line Time Distortion** (see Figure 12, which shows a distorted signal) — Distortions to horizontal scanning lines (representing horizontal line tilt, over-shoot, ringing, or smearing), expressed as percentages. Distortions will cause loss of picture clarity or close-in "ghosts" which appear right next to the primary image.

**9. Field Time Distortion** (see Figure 9, an illustration of hum) — The distortion of vertical rate information due to low-frequency response problems or hum.

**10. System Timing**—Two or more video signals that should coincide in time, amplitude, and subcarrier phase. An example is the mix/effect amplifier in a production switcher.

### Measuring a Color Camera (Reference System Drawing)

Testing of the color camera is done with a waveform monitor and vectorscope.

The assumption is that the color camera is one with a three-tube head, viewfinder, and zoom lens. Camera charts are available, e.g., the EIA Chip Chart and the Registration Chart. Using the chip chart and a waveform monitor, we can adjust the luminance, gray scale, white, and black levels per manufacturer's specifications. The situation for our testing will be that the camera's color bar module output is turned to the "ON" position so that we are looking at the encoder output.

We want to examine the overall composite video gain, which should be 140 IRE units (1 volt peak-to-peak). The waveform monitor is set as follows: Flat response, 2H Display, Internal Reference, and DC Restore ON. It is important that we have proper relationships between the usable video of 100 IRE units and the sync gain of -40 IRE units. Setup must be set to 7.5 IRE units; burst amplitude peak-to-peak is set to 40 IRE units, and there are 8-11 cycles of subcarrier in the burst. The sync rise time should fall between 125 nanoseconds and 250 nanoseconds. (To measure this, magnify the display and use the horizontal time measurement scale at 0 IRE to determine how long it takes the trace of the sync pulse to go from 0 to -40 IRE. Since this measurement is usually done at 90%, the display is actually measured from -4 to -36 IRE.) Horizontal sync pulse width should be 4.5 to 4.75 microseconds from the midpoint of the leading edge (at the left of the display — waveform displays are read from left to right) to the midpoint of the trailing edge (at the right). Horizontal blanking must be 11.1 microseconds, maximum.

Now set the waveform monitor to Field position with DC Restore OFF. The vertical blanking period, when checked, should be formatted as described earlier, and low frequency or hum should not be more than  $\pm 1$  IRE. (Note: When using an





Figure 11, a modulated staircase in the vector mode with increased gain. This display shows differential phase distortion. If the signal were acceptable, all of the dots at the left would fall on top of each other at the edge of the circle on the 0° mark. This signal shows some falling beyond the circle's edge and from 3° to 7° below the 0° line (180° axis).

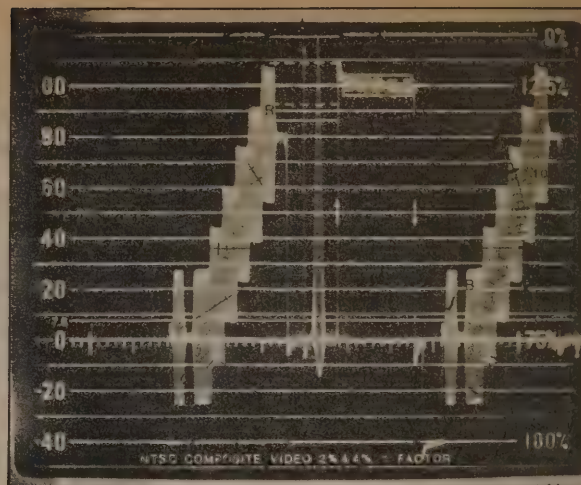


Figure 12, the display for a signal that has overshoot (rises above 100 IRE), tilt, and excess chroma gain. If the signal were acceptable, the white line at the top, right of center, would be straight and within the boxes on the graticule. This one misses them both horizontally and vertically and runs downhill from left to right with a severe drop at the left.

EIA chip chart, move the response selector of the waveform monitor from Flat to IRE. In this response mode, proper luminance levels can be set.)

Next, set the vectorscope to Vector Display and Internal Reference. The subcarrier signal should be positioned on the 180° axis (see Figure 4). All primary colors—red, green, and blue—should be positioned in the center of their boxes, and complementary colors—yellow, cyan, and magenta—should fall properly into their respective boxes. The horizontal sync signal can be observed as a “figure 8” at the center crosshair point on the vector graticule. Horizontal sync should be locked. If it is not locked, you will notice that the “figure 8” is actually spinning.

If the test signals for the camera do not

conform to the descriptions in the last few paragraphs, here are some of the common problems that might be the cause:

- 1) Wrong termination, or no 75-ohm termination at all.
- 2) A defective cable-to-connector connection.
- 3) The video distribution amplifier is misadjusted.
- 4) The color encoder is misadjusted.
- 5) You have a defective sync generator.
- 6) The measurement equipment is not in calibrate position.

### Measuring a Switcher with Mix and Effects

When you measure a production switcher, regardless of the number of inputs, it is imperative that all inputs be properly timed and phased. Timing errors are seen as shifts in horizontal time. Timing shifts,

horizontal or vertical, become very apparent when using the switcher's corner insert mode; the transition from corner to corner will not be smooth.

Phasing errors are seen as shifts in the color characteristics. Differential gain and phase through the mix/effect amplifier can cause impairments to picture information, but should not be confused with phasing problems.

To measure the production switcher set the waveform monitor as follows: Flat response, Display 2H, Reference internal. Select the window signal which will determine proper video balance, i.e., that the amplitude and sync are to the proper proportions, or show any line time distortions. Observe the results on the waveform monitor.

Figure 13, a black burst signal, from one input of a switcher for example, with the leading edge aligned with a timing reference mark at the 0 IRE level, left. The reference used is external.

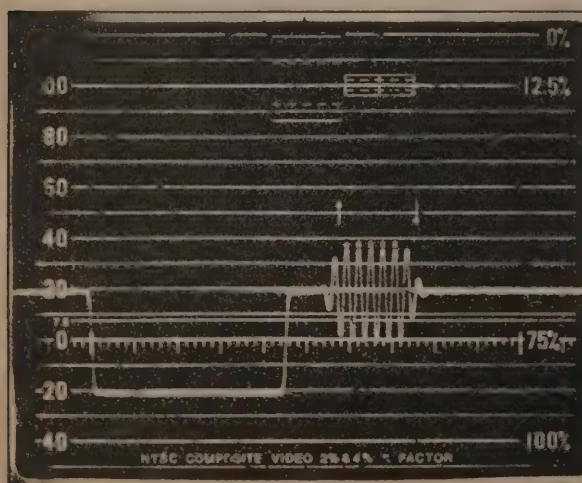
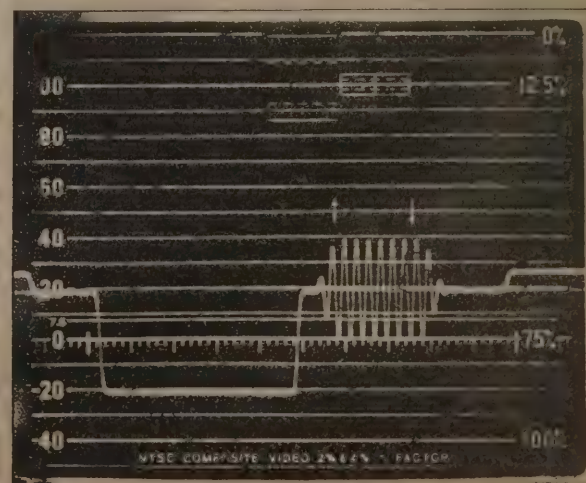


Figure 14, same display from another input of the same switcher. Note the leading edge has shifted to the right by about 0.3 microseconds, so the timing error between the two inputs is rather severe.





Next, select the Field Square wave test signal, which will be used for field time distortion. Switch the waveform monitor to Field position, DC Restore OFF, and observe the flatness of sync pulses at the -40 IRE level; they should lie along that line in their entirety. You should also measure the frequency response of the system from time to time.

To make differential gain measurements, set the response to Chroma, DC Restore ON, Display 1H. The test signal should be the modulated five-step staircase (See Figure 6 or 11). Since only chrominance information is being displayed, you can now increase the vertical gain so that the maximum peak-to-peak Chroma level is at 100 IRE units by using the knob at the right on the front panel, below the center (see Figure 2). Compare the smallest amplitude of Chroma to the 100 IRE reference; the differential gain is specified in terms of the percentage of difference. The manufacturer's specifications will assist you in determining the acceptable amount of differential gain.

To measure the switcher's chrominance balance and phase, select the color-bar signal and observe the results on the vectorscope. Make sure the phase, amplitude, and subcarrier relationships are correct, as shown in Figure 4.

To examine switcher timing, set the waveform monitor to: Flat response, DC Restore ON, 2H Display magnified to 1 microsecond per division, Reference external. The external reference signal should be the black burst which determines the system timing. Adjust the vertical and horizontal positioning of the display so that the midpoint of the leading edge of the horizontal sync pulse falls on a reference mark of the timing scale. Operate the switcher to switch between its various inputs; any errors in signal timing will

cause a position shift of the sync pulse which can be measured in microseconds. Figures 13 and 14 show test displays from two different switcher inputs that exhibit a rather severe timing error. Any such timing problems must be corrected.

System phasing may be checked with a similar technique. With the monitor set to the vector mode, operate the switcher so it routes all inputs to the output in sequence. Any errors in phase of the subcarrier reference will show as rotations of the vector pattern. The vectorscope scale can be used to determine the magnitude of such errors. The rotation between Figures 15 and 16 shows a phasing error of about 50°. Again, such errors must be corrected.

Differential phase measurements are required from time to time. The test signal to use is the five-step modulated staircase signal. Using the vector mode, adjust the gain control to set the amplitude of the test vector to the edge of the circular scale of the graticule on the 180° axis. The differential phase error is determined by reading the peak displacement on the degree scale at the left. Figure 11 illustrates a vector that shows distortion. If everything is correct, the dots should lie one on top of each other at the perimeter of the graticule on the 0° mark. This display shows a displacement of between about 3° and 6° below the horizontal axis.

Some of the common problems that cause errors which become evident when switcher output is measured are: 1) Wrong termination or no 75-ohm termination. 2) Defective cable or connector connections. 3) The video source/sources is/are not timed or phased to the system. 4) New video equipment has been added to system without proper timing or phasing. 5) The system was not brought up to proper operating temperature prior to

phasing and timing of systems. 6) You have a defective sync generator or defective distribution amplifiers. 7) The measurement equipment is not in the calibrate position.

## Measuring a 3/4U VCR Using the E-to-E Mode

When you test a 3/4U recorder with a waveform monitor and vectorscope, the test signals should be the color bar and multiburst. All testing must be done in the E-to-E mode. For additional testing, it is recommended that you obtain the manufacturer's specifications. It should be noted that the response for color in the 3/4U format is typically 260 horizontal lines of resolution. Since bandwidth and resolution are interrelated, the U-Matic recorder will not pass the 3.58 to 4.2 MHz signal, so do not expect a flat response in this frequency range. When using the color-bar signal, all amplitudes and phasing relationships should be the same as those already discussed for testing cameras and switchers. Because of the technology used to record color, the dots on the vector display will not be as crisp, however.

Some of the common problems which will cause a recorder to demonstrate errors when tested are: 1) Wrong termination or no 75-ohm termination. 2) The VTR's electronics are defective or misaligned. 3) The measurement equipment is not in the calibrate position.

These are the basic parameters for testing the three pieces of equipment in a simple video production system. Needless to say, if you want your recorded or distributed video signal to be of the best possible quality, regular testing and measurement is mandatory. Don't begin production without it. □

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Figure 15, a vector display of the black burst signal, from one input of a switcher for example, aligned with the 180° axis of the graticule. The reference used is external.



Figure 16, the same display from what could be another input of the same switcher, showing a bad phase error. The vector has shifted about 50° as compared to Figure 15.





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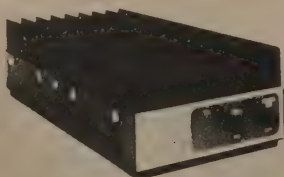
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**THATS IT! It's easy!**



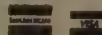
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450 AEA Isopole omni antenna . . . . . \$59 del.  
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Mirage D1010N 100 watt pep all mode amp . . . . . \$289 del.  
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### 3. FMA5 AUDIO SUBCARRIER GENERATOR..... \$29 del

Transmits broadcast standard sound with your picture. Accepts a low Z mic (100-600 ohms). also line level audio from VCRs, camera mics, computers, etc. Up to 1 v p-p drive to the TXA5, VM-2, or VM-4 modulators. Works with any transmitter with 5 mHz modulation bandwidth. Draws 20 ma from 13.8 vdc supply.

All modules can be run from a 3 amp 13.8 vdc regulated power supply. A good UHF T/R relay should be used, we stock the Magnacraft W120X-14 at \$44 delivered. The modules should be mounted in an aluminum chassis or cabinet for heat sinking and shielding. See chapter f4 of 1983 ARRL Handbook.

## 420-450 mHz ATV RECEIVING DOWNCONVERTERS



TVC-2



TVC-2G



TVC-4

### TVC-2 ATV DOWNCONVERTER .....\$49 delivered

Wired and tested module connects between 70 cm antenna and TV set tuned to channel 2, 3, or 4. Varicap tunes the whole 420-450 mHz amateur band. Sensitive MRF901 preamp, stage digs out the weak ones and the hot carrier double balanced mixer resists intermod and overload. Requires +11 to 18 vdc at 20 ma.

### TVC-2L more sensitive with NE64535 preamp stage ..... \$59 del

### TVC-2G most sensitive with GaAsFet (.5db NF) stage ..... \$79 del

It can be mounted in the shack, but is designed for antenna mounting for best sensitivity (Besides low noise figure, you gain the feedline loss). Has extra double tuned bandpass filter to reject strong UHF TV stations.

### DCB DOWNCONVERTER CONTROL BOX .....\$59 del

Provides variable 10 to 18 vdc thru coax to antenna mounted downconverters such as TVC-2G and TVC-12G. Also has 15 db gain line amp to drive long lines or splitters. Ready to go, comes in same cabinet as TVC-4.

### TVC-4 PACKAGED DOWNCONVERTER with AC supply...\$89 del

Contains the TVC-2, 120 vac supply, ready to go. BNC antenna input and F connector TV output. Handy for ATV demos, or community TV systems outside of the USA. Size is 5.3 x 2.5 x 7 inches.

### TVC-4L contains the more sensitive TVC-2L..... \$99 del

\*Attention clubs, groups and exporters ..... the following quantity discounts apply to one module ordered at one time and sent to one address: 5-24 10%, 25-49 15%, 50-99 20%, 100-up 25%.

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# P.C. ELECTRONICS

## 1200 MHz ATV SYSTEM

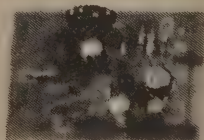


**TVC-12G, DCB, & ANTENNA PACKAGE.....\$195**

**TVC-12G 1215-1300 mHz DOWNCONV. to ch 8 ....\$89**  
GaAsFet preamp stage. Remote varicap tuned. Mounts at antenna

**DCB DOWNCONVERTER CONTROL BOX .....\$59**  
Provides reg 10 to 18 vdc at up to 150 ma to center of input coax to tune ant. mounted downconverters. Includes 15 db gain line amp.

**23 ELEMENT F9FT 23 CM YAGI ANTENNA.....\$49.50**  
Measured 16.3 dbd gain. 5'10" boom. "N" connector included. ATV, AO-10 mode L, SSB, FM, etc.



DM-1



TVG-1



TVG-12



TVG-23



VM-2



VM-4

**DM-1 RF/VIDEO DETECTOR & MONITOR .....\$20ppd.**

Samples RF off xmtr coax and outputs 1 v p-p video to monitor your own camera and setup. Also outputs to a external 50 uA meter for relative power. Req. +12 to 18 vdc at 25 ma. PC board only .....\$5ppd.

## ATV RF MODULATORS and TEST GENERATORS

Connect your camera video or audio gen to these mighty milliwatt xmtrs and you are on the air for demos, ant tests, receiver alignment, or QRP DX!

**TVG-1** tunes 400-480 mHz, req 9 to 12 vdc.....\$15ppd.

**TVG-12** tunes 1200-1300 mHz, req 9 to 12v .....\$15ppd.

**TVG-23** setable 2.1 to 2.5 GHz req 11 to 18v .....\$20ppd.

**TSQ-1 TV S-METER AND SQUELCH BOARD .....\$5ppd.**

Add common or Radio Shack parts, tap into TVs video IF AGC line, break one speaker lead, and you can better align the antenna, give relative signal reports, and have no noise between contacts.

**VM-2 TUBE TYPE XMTR MODULATOR .....\$20ppd.**

Grid Modulates tetrodes: 5894, 6907, 6524, and high power 4x250s (K2RIW) & 8930s (ARCOS). Used on RCA CMU-15 FM rigs, and with the addition of one 2N3738 (\$5) is used on high power amps as in August 82 QST.

**VM-4 2C39 TRIODE CATHODE MODULATOR .....\$25ppd.**

Get full color and sound on 400, 1200, & 2300 mHz 2C39 tube type amps.

## VIDEO SPECIAL EFFECTS:

Family of plugin cards designed to superimpose characters, supply external sync, and other effects to be added later. Start your effects cardage now with the VDM-3 and VID-3. A must for repeaters!

**VDM-3 VIDEO DISPLAY MIXER** 2 camera switcher, superimpose mixer, V & H drive outputs, and raster gen.....\$69ppd

**VID-3 VIDEO IDENTIFIER** Superimposes call or any 6 letters in camera video. 1 programmed PROM included. Works with VDM board...\$69ppd

**IDS-3 ID SEQUENCER** steps thru up to 5 PROM ID memories to show call, city, CQ, repeater, etc .....\$49ppd. PROMS \$10 ea.

**CBG-3 COLOR BAR & PATTERN GEN.** Uses 16 pattern MM5322N chip. Camera & gen video switcher, xtal controlled, many features....\$99ppd

**AIM-3 AUDIO & ID MIXER.** Mix & remotely switch or attenuate 4 audios & programmed MCW ID. Line & 4W speaker outputs .....\$69ppd.

**VC-3 VIDEO CLOCK** inserts time on screen w/VDM-3 .....\$69ppd.

VC-2 stand alone module accepts any video input .....\$89ppd.

VC-3



VID-3



See chapter 8 of "Everything You Always Wanted to Know About Amateur Television" Book.



# GET YOURS & SEE THE OTHER NEW PRODUCTS AT DAYTON! THE "KREEPIE PEEPIE" ATV TRANSMITTER IS HERE!



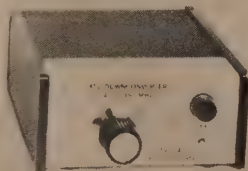
## KPA51 WATT ATV TRANSMITTER BOARD FEATURES:

- ★ 1 watt pep minimum RF output on sync tip.
- ★ Full color and sound on one board.
- ★ Small 3.25x4"
- ★ Runs on external 13.8 vdc at 300 ma supply or battery.
- ★ Wired and tested board covers 421 to 439 mHz.
- ★ Supplied with one xtal on 426.25, 434.0, or 439.25 mHz but capable of 2 freq operation with the addition of 2nd xtal. Other 70cm freq. available on special order.
- ★ Mic input from a low Z dynamic and line level audio input found in most portable color cameras, VCRs, or home computers provided.
- ★ Schematic and application notes supplied for typical external connections, packaging, and system operation.
- ★ Price delivered via UPS surface in the USA is only \$159. Technician class amateur license or higher required for purchase and operation.

## DO SOME OF THESE APPLICATIONS INTRIGUE YOU?

1. **PORTABLE CORDLESS TV CAMERA.** No heavy VCR to lug around or cable length limitation. You can even use your home VCR rather than a portapak. Now you can creep around and peep thru your camera more easily. Gives good pictures up to a mile with simple whip, and 40 miles using beams in flat terrain.
2. **MOBILE OR PORTABLE ATV** for public service events such as races, parades, marathons, etc. A Mirage D24N 40 watt amp can be added for greater mobile coverage or base operation. Mount in an airplane for CAP and rescue searches for an eye in the sky.
3. **REMOTE CONTROL OF R/C AIRPLANES or ROBOTS.** Fly with a camera in the nose to control as if you are in the plane. Likewise a robot can now be out of site of the operator.
4. **REPEATER SITE SECURITY OR COMPUTER VIDEO DISPLAY.** Turn on thru your repeater a camera at the site to see the area, weather, read meters, or if a computer is used, show status, play games, etc. by remote control. With all the new technology using TV displays, it is natural for hams to adapt these new products to transmission over the air. What applications come to your mind?

**WHAT IS REQUIRED FOR A COMPLETE OPERATION SYSTEM?** A TV set with a TVC-2 or TVC-4 420-450 mHz to channel 3 downconverter, 70 cm antenna, and coax cable to receive. Package up the KPA5, add 12 to 14 vdc, antenna, and any tv camera, VCR, or computer with a composite video output. Simple, eh?



## ACCESSORIES:

Downconverter: TVC-2 wired & tested board ..... \$49  
Varicap tuned. Requires +11 to +18 vdc at 20 ma.  
TVC-4 (TVC-2 in cabinet with ac supply ..... \$89  
more sensitive "L" versions with NE64535 preamp  
stage add \$10.

Mirage D24N 1 in / 40 wats out all mode amp ..... \$179  
450 ISPOLE omni gain 70cm antenna ..... \$59  
J Beam 48 element 14 dbd gain 70cm antenna ..... \$64  
100' roll Saxton 8285 50 ohm low loss coax ..... \$41

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We are a full line supplier of ATV products including transmitters, antennas, cameras, downconverters, Mirage 70cm amplifiers and much more. Want to know who is on ATV in your area? Ask, and we will check our list for you. Our address is for mail order only, we are primarily a manufacturer not open to the retail public. We accept Visa and Mastercard, money orders, cash only CODs, and checks. Californians only, please include sales tax.

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2-84



# CHEAP 10 GHZ. ATV!

GUARANTEED LITTLE QRM HERE...

Written for "A5 ATV Magazine"  
by Ed Sullivant WB5MAP  
1112 17th Avenue  
Plattsmouth, Neb. 68048

This article is for people who like to tinker with simple things that are inexpensive.. Yes, I have been called simple-minded and so tight my main spring broke. Anyway, with a modest amount of scrounging it is possible to get on 10 GHZ easily and with very little cost. Not counting the camera (or video source such as a computer) and a TV, all the parts came from scrounging or the junkbox.

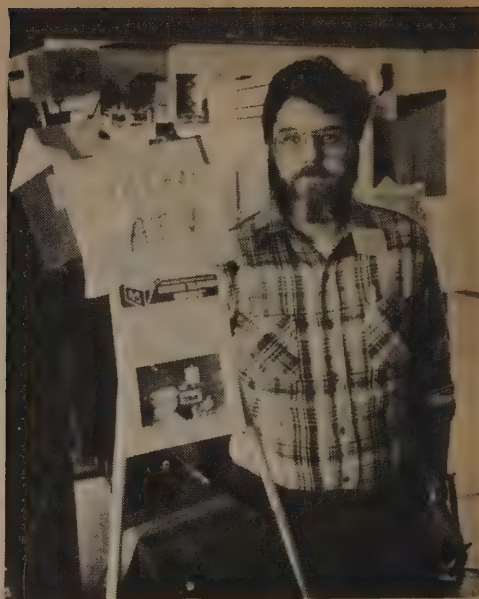
Microwave motion detectors used in burglar alarm systems are slowly going out of service. Evidently, they present false alarms too often and not many want to bother fixing them. They operate just out of the 10 GHZ amateur band and can tune through the amateur band without any trouble.

I scrounged the motion detectors from two businesses. Each source required that they wouldn't be returned to security or alarm service. In fact all I wanted was what they referred to as the "source" which was the 10 GHZ cavity and feedhorn. Everything else went into the junk box. One business is a small part time business repairing alarm systems in a basement. He had several units in a corner with defective "sources" that he gave me as soon as he knew what I wanted them for. The second business is a national company that is taking them out of service as soon as they break. In the first case 8 out of 9 worked and in the second case 4 out of 9 worked. Even in the case of bad Gunn diodes, the diodes only cost about \$20.00. Another source can be found later in this article.

The Gunn diode motion detectors come in at least three types. a transceiver has a mixer in the cavity with the Gunn diode. A transmit-only has a Gunn diode no mixer and therefore cannot receive. A transmit-receive combination has separate transmit and receive cavities with the RF coupled to the receive cavity with a short piece with hardline. I have only experimented with the transceive and the transmit-only types, but I can see no reason why the transmit-receive combination wouldn't work like the transceivers.

**THEORY OF OPERATION.** The Gunn diode oscillator works comfortably on 6.5 to 8.5 volts with little change in output power. If this voltage has video or other voltage superimposed on it, we now would have an oscillator with a little AM and some FM characteristics. Just like Bob Richardson, W4UCH, of the The Gunnplexer Cookbook 1, I don't know how it works. I won't go as far as to call it the Sullivant effect, but it is the easiest mode of amateur radio operation I have found yet and the cheapest.

The 7805 regulator rides 5 volts above a reference point determined by the conduction of the transistor. A 2N2222A was used in the circuit shown. Any general purpose NPN transistor with medium (50-100) gain with the necessary frequency response for video will do. The bias resistors may have to be adjusted if a change is made. The LM317



WB5MAP demonstrated 10 GHZ. ATV at the Wheaton, Ill. and Davenport, Iowa "Hamfest" early in 1984

regulator provides a stable reference for the transistor to work with. The Freq Adj pot is a panel control. The Freq Trim pot is adjusted with the Freq Adj panel control at minimum resistance for about 8.25 volts at the output of the 7805. You should now be able to adjust the output from about 7.5 to 8.25 volts with the Freq Adj pot. This corresponds to approximately 8 MHz or more than two TV channels.

The input circuit has both Sub-carrier In and Video In with a 4.5 MHz trap. You can use only the one you need and delete the other if it is not used. Start with the modulating input adjustment at maximum resistance and work down until the picture or audio is best.

A 4.5 MHz audio sub-carrier can be added very easily. The W60RG circuit 2,3 works great with only one minor modification. I eliminated the output adjust pot.

The receive end is the simplest. Just connect a piece of RG59 through a balun to your TV. I have tried matching impedances at the mixer (about 2K ohms) and found nothing to gain bouncing the picture around my basement. Longer distances will require warmer weather.

Mechanically tuning the cavity is easy, but I wouldn't recommend it unless tuning with the Freq Adj pot won't bring the signal in its normal tuning range. The brass tuning screw with the locknut is the only frequency adjustment on the cavity. The other tuning screws are mainly for SWR, so don't bother them. Find someone with a calibrated signal source or a method of measuring the frequency. Yes, there was a trick to this article. With a calibrated signal source (such as a Gunnplexer (tm)) use the transceiver as a receiver. Connect your TV to the mixer and set the Freq Adj pot at mid-range. Now loosen the locknut and adjust the brass screw for the first good white raster. Since the oscillator is above the Amateur band, you are now at your reference frequency plus the frequency of the TV station you chose. Carefully tighten the locknut.



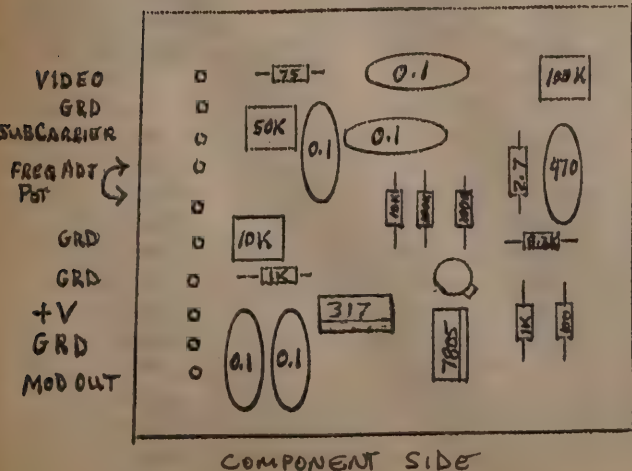
**CIRCUIT NOTES.** The circuit in the schematic has been tried with at least a half dozen variations with success. Point to point wiring with standoffs on a single sided PCB and pen and etch PCBs work equally well. Don't forget the decoupling capacitors. All resistors were 1/8th watt carbon or metal film. Component values can be substituted, but watch the bias on the transistor. I used 18 turn trimmers for ease of adjustment.

A limited number of Gunn diode transceivers and transmitters taken from security service are available from Surplus Sales of Nebraska, 2412 Chandler Rd., Bellevue, Nebraska, 68005 for a reasonable cost. They will be checked out and set on frequency with the circuit shown. They will be set on 10.250 GHz and 10.250 + channel 2 and 3 plus or minus 10MHz at your choice. The broad tolerance is because of possible temperature variations from where they are set up and where they will be used.

**CAUTIONARY NOTE:** The Gunn diodes should not be removed from their holders unless absolutely necessary. They are extremely fragile and the little buggers are easily lost if dropped on a crowded bench. The Gunn diodes used are normally operated at 7.5 volts and can work up to 10 volts. Above this they tend to go poof so check the modulator output before connecting the Gunn diode.

**REFERENCES:** 1. CHAPTER 16, THE GUNNPLEXER COOKBOOK, BOB RICHARDSON, 1981, HAM RADIO PUBLISHING CORP. 2. FMA5 AUDIO SUBCARRIER GEN REVISITED, AS MAGAZINE, TOM O'HARA, MAY-JUNE 1980. 3. PAGE 14-32, ARRL HANDBOOK, 1981. Ed Sullivant, WBSMAP 1112 17th Ave., Plattsmouth, NE. 68048

**PARTS LIST:** 1 - LM 317 Adjustable Voltage Regulator, 1 - 7805 + 5 Volt Regulator, 1 - 2N2222A, 4 - 0.1 Microfarad Disk Capacitor, 1 - 470 Picofarad Capacitor, 1 - 2.2 Microhenry Coil, 1 - 100K Trimpot, 1 - 50K Trimpot, 1 - 10K Trimpot, 1 - 10K Pot, 1 - 75 Ohm 1/8 Watt Resistor, 1 - 100 Ohm 1/8 Watt Resistor, 2 - 1K Ohm 1/8 Watt Resistor, 1 - 8.2K Ohm 1.8 Watt Resistor, 1 - 10K Ohm 1/8 Watt Resistor, 2 - 100K Ohm 1/8 Watt Resistor.



COMPONENT SIDE

FOIL  
SIDE

## SURPLUS SALES of NEBRASKA

**CONNECTORS**

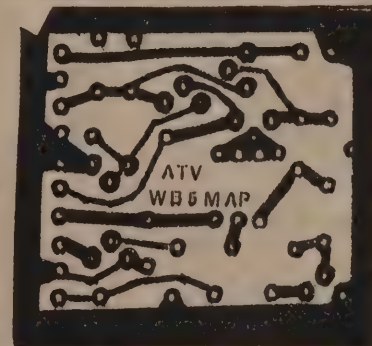
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| "N" plug RGS      | \$3.00 | "C" plug RGS                     | \$4.95 |
| "N" plug RGS      | \$2.75 | "C" plug (heavy)                 | \$6.95 |
| "N" elbow         | \$4.50 | "C" jack                         | \$3.75 |
| "N" tee (1-m-f)   | \$7.95 | "C" tee (1-m-f)                  | \$3.95 |
| "N" tee (1-m-f)   | \$5.95 | "UHF" tee (1-m-f)                | \$2.75 |
| "N" barrel        | \$5.95 | "HN" plug RGS hvy                | \$7.95 |
| "N" double male   | \$7.95 | <b>SERIES TO SERIES ADAPTERS</b> |        |
| "N" bulkhead      | \$3.50 | "N" plug to "BNC" jack           | \$5.50 |
| "N" panel jack    | \$4.95 | "N" plug to "C" jack             | \$4.95 |
| "N" cap & chain   | \$ .95 | "N" jack to "PL-259"             | \$5.95 |
| "BNC" barrel      | \$2.95 | "N" jack to "BNC" plug           | \$5.95 |
| "BNC" flg bulkhd  | \$3.25 | "N" jack to "C" plug             | \$6.95 |
| "BNC" hole bulkhd | \$2.75 | "N" jack to "TNC" jack           | \$5.95 |
| "BNC" double male | \$4.95 | "N" jack to "TNC" plug           | \$7.95 |
| "BNC" elbow       | \$3.95 | "N" 51 ohm 2 watt term           | \$1.50 |
| "BNC" tee (1-m-f) | \$3.75 | "BNC" jack to "C" plug           | \$6.50 |
| "BNC" cap & chain | \$0.75 | "BNC" jack to PL-259             | \$2.95 |
| "BNC" plug RGS    | \$1.95 | "BNC" jack to "HN" plug          | \$7.95 |
| "C" barrel        | \$4.95 | "BNC" jack to "N" jack           | \$6.95 |
| "C" elbow         | \$4.95 | "BNC" plug to SO-239             | \$4.95 |
| "C" plug RGS      | \$5.95 | PL-259 to "C" jack               | \$4.95 |

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# SE-1a UHF ATV TRANSCEIVER: (NEW ONE BOARD DESIGN) KIT COMING SOON!

## STANDARD FEATURES

- SA-1 SYNC AMP FOR SOLID STATE LINEAR AMPLIFIER USE.
- 2 RF STAGE DC-1 CONVERTOR WITH LOW NOISE NE64535 FIRST STAGE.
- BOTH FM AND 4.5MHZ SUB-CARRIER AUDIO.
- RECEIVE TUNES FROM 418MHZ THRU 455MHZ – OUTPUTS TO TV CH. 2, 3 or 4.
- STABLE CRYSTAL CONTROLLED TRANSMIT – 439.25 MHZ STANDARD – OTHERS AVAILABLE.
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- 10.8" x 6.2" x 2.5"

★ 2 FREQ. ADD \$25.00

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Add a camera, antenna, mic, 13.6vdc and a TV  
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| PMH2-70 STACKING HARNESS FOR 2 J BEAM ANTENNAS             | \$16.95 |

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# ATV KITS AND MODULES

- VM-2 VIDEO MODULATOR** — Wideband collector video modulator for solid state exciters such as those from GLB and Hamtronics. Input for 4.5MHZ audio sub-carrier. 2½" x 1½"; **\$15.50** kit, **\$19.95** assembled.
- A-2 4.5MHZ AUDIO SUB-CARRIER** — Accepts audio from VCR or GLB audio processor to provide ATV audio on TV set. Has on-board voltage regulator and shielded inductor. 2 3/4" x 1"; **\$19.95** kit, **\$25.95** assembled.
- SA-1 VIDEO SYNC AMP** — Provides separate video sync gain control for VM-2 above or SE-1a transceiver. Useful when driving solid state amps. 1 3/4" x 1 1/4"; **\$15.95** assembled, **\$12.95** kit.
- DC-1 UHF CONVERTOR** — Varactor tuned with 2 RF stages. **NE64535** input standard. Double sided stripline design. Outputs to TV ch. 2, 3 or 4. Can be tower mounted. 11 — 14vdc. 2" x 3". **\$39.95** kit, **\$54.95**, assembled, **\$89.95** complete in box.
- P-1 WIDEBAND LOW NOISE UHF PREAMP** — Uses **NE64535** transistor for min. 18db gain and 0.6db noise figure. Covers 420—450MHZ band. Other frequencies received with change in input inductor. 2 1/4" x 1 3/8"; **\$22.95** kit, **\$31.95** assembled.
- LA-1 UHF AMPLIFIER** — Uses 15 watt MRF641 transistor with 7.8db gain @ 470MHZ. Stripline inductors with on-board pin diode antenna switching for a receiver. Designed for wideband color video with exciters such as the GLB T450L that provides up to 3 watts drive. Drilled and tapped heatsink included ( 4 1/2" x 1 3/4" ). 1 to 3 watts drive typically gives 6 to 18 watts output. 12 — 14vdc operation @ 4 amps max. Double-sided board is 4 ½" x 2". **\$79.95** assembled with test data.

**LA-45 UHF AMPLIFIER** — Uses MRF646. Input power of 6-15 watts typ. gives 20-50 watts output. Biased for linear operation. Kit includes all parts, instructions and 4.2" x 3" double-sided stripline board. Needs 12-14 vdc @ 9 amps max. **\$64.95** kit. 4" x 5.5" x 1.75" heatsink **\$15.00**.

**GLB T450L TRANSMITTER** — 4 1/2" x 2" RF board typically supplies 2—3 watts FM output, 1 — 1½ watts average video RF output. Changes for wideband video modulation provided. Comes with crystal for 439.25MHZ, with other frequencies available upon request. Also includes separate 1" x 4" audio processor board which supplies audio for FM modulation or for the A-2 4.5MHZ audio kit above. 12—14vdc @ 2 amps max. **\$89.95** kit, **\$89.95** assembled and tuned. \*Kit now with pre-wound coils\*

**COMMON TO ALL KITS AND MODULES** — 12 to 14 vdc operation. Drilled and plated glass circuit boards. Quality components with instructions including schematic and board layout.

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## SPECIALIZED COMMUNICATIONS MEETING AGENDAS ANNOUNCED!

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TO MEET AT FORUMS ON FRIDAY, SATURDAY & SUNDAY

"LETS WORK TOGETHER" is the symbol of the UNITED STATES ATV SOCIETY and "working together" is what DAYTON 1984 is all about this year! A full lineup schedule has been assembled by Dr. Don Miller W9NTP of Waldron, Indiana. DAYTON has 3 Flea Market days this year starting at noon on Friday. The annual FRIDAY NIGHT SSTV Experimenters "get-to-gether" meeting conducted by Dr. Robert Suding W8LMD will be held this year at the HOLIDAY INN NORTH. Prior to this meeting will be a DINNER BANQUET (6 P.M.) at \$10.50 per person. Advance Seating Reservations may be made thru W9NTP at P.O. Box 95, RR#1, Waldron, Indiana 46182. Following the BANQUET will be the SSTV EXPERIMENTER'S MEETING to start at 7:00 p.m. Featured will be Ben Blish N4EJ1, Dr. Robert Suding W8LMD and others on computer generated SSTV/FAX methods. Also expected are Volker Wraase DL2RZ from West Germany to demonstrate his new High-Resolution SC-1 combination SSTV/FAX Converter and Dr. Ralph Taggart W8BDQT of Michigan to demonstrate the K&AEP TRS80C Color Computer System for SSTV and FACSIMILE modes. USATVS and IVCA members will jointly participate in this meeting together.

An extended Saturday afternoon SSTV/ATV FORUM will be held in a new meeting room designated #2 from 1:15 p.m. to 3:30 p.m. Featured speakers include #1 Dr. Ralph Taggart W8BDQT of Mason, Michigan (SSTV AND FACSIMILE PICTURE RECEPTION USING COMPUTERIZED TECHNIQUES), #2 Mr. Bruce Brown WA9GK/4 of the METROVISION ATV CLUB in Virginia (STS-9 LIVE VIDEO TRANSMISSION RELAYS VIA HAM-TV and discussions of a new 56 KILOBIT FSTV TRANSMISSION method that might be used for 220 Mhz. ATV and HOW TO PARALLEL HIGH-POWERED SOLID STATE ATV LINEARS). #3 Bill Bryant K9KKL from Springfield, Illinois on USING K2RIW HIGH-POWERED UHF AMPLIFIERS FOR FAST SCAN TV (Recently featured in "A5 MAGAZINE").

More to come on Saturday...

Saturday night "after hour" festivities include the Annual "A5 ATV MAGAZINE/PC ELECTRONICS" ATV HOSPITALITY SUITE #202 held once again at the LA QUINTA MOTOR INN NORTH in Dayton. Tom O'hara W6ORG will demonstrate his new KPA5 KREEPY PEEPIE UHF-ATV Transmitter, "LIVE ON-THE-AIR" FSTV transmissions will be sent and received thru the Dayton ATV Repeater System (W8BI 439.25 Mhz. IN/ 426.25 Mhz. OUT - 147.450 FM Talk Channel) as well as a new "A5" HOTEL TO HOTEL and MOBILE FSTV Contest which runs Thursday thru Saturday night. All ATV'ers are encouraged to bring their VHS or BETA local activity tapes, photographs and "homebrew" FSTV projects for display and judging. With all this going on in one big weekend, how can you afford to miss? Make your plans to attend THE DAYTON EXPERIENCE.

- ★ TECHNICAL FORUMS
- ★ ARRL AND FCC FORUMS
- ★ GIANT 3-DAY FLEA MARKET  
Starting Noon Friday  
All Day Saturday and Sunday
- ★ NEW PRODUCTS AND EXHIBITS
- ★ GRAND BANQUET
- ★ ALTERNATIVE ACTIVITIES
- ★ ELECTRICAL SAFETY FORUM
- ★ SPECIAL GROUP MEETINGS
- ★ YL FORUM
- ★ PERSONAL COMPUTER FORUM
- ★ CW PROFICIENCY AWARDS
- ★ AMATEUR OF YEAR AWARD
- ★ SPECIAL ACHIEVEMENT AWARDS

### ADMISSION

\$7.50 in advance, \$10 at door.  
(Valid for all 3 days)

### BANQUET

\$14 in advance, \$16 at door.

### FLEA MARKET SPACE

\$15 in advance.  
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Checks for advance registration to  
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April 27, 28, 29, 1984

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If you have registered within the last 3 years you will receive a brochure in January. If not, write Box 44, Dayton, OH 45401.

Nominations are requested for Radio Amateur of the Year and Special Achievement Awards. Nomination forms are available from Awards Chairman, Box 44, Dayton, OH 45401.

For special motel rates and reservations write to Hamvention Housing, Box 1288, Dayton, OH 45402. NO RESERVATIONS WILL BE ACCEPTED BY TELEPHONE.

All other inquiries write Box 44, Dayton, OH 45401 or phone (513) 433-7720. ALL Flea Market spaces will be sold in advance ONLY. NO spaces sold at gate. Entrance for set-up available starting Wednesday. Special Flea Market telephone (513) 223-0923.

Bring your family and enjoy a great weekend in Dayton.

Sponsored by the Dayton Amateur Radio Association, Inc.

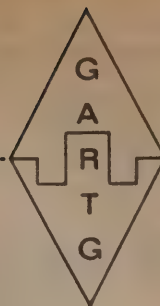


# DAFG

Deutsche Amateur Fernschreib Gruppe e.V.

# GARTG

German Amateur Radio Teleprinter Group



## 13th GARTG-RTTY-Contest 1984

**General:** The German Amateur Radio Teleprinter Group (GARTG) e.V. sponsors their 12th GARTG-Short-Contest and welcomes participation of all RTTY-Amateurs in and outside the Federal Republic of Germany.

There will be a shortwave and VHF-Contest. Both contests will be scored separately. The contest is split in 5 single contests within a year. After the 5th single contest the winner of the year in each classification will be stated.

### Shortwave:

|           |          |       |           |               |
|-----------|----------|-------|-----------|---------------|
| 1st part: | Saturday | Febr. | 18th 1984 | 1300-1700 UTC |
| 2nd part: | Sunday   | April | 15th 1984 | 0700-1100 UTC |
| 3rd part: | Saturday | June  | 9th 1984  | 1200-1600 UTC |
| 4th part: | Sunday   | Aug.  | 26th 1984 | 0700-1100 UTC |
| 5th part: | Saturday | Oct.  | 13th 1984 | 1300-1700 UTC |

### VHF:

|           |          |       |           |               |
|-----------|----------|-------|-----------|---------------|
| 1st part: | Sunday   | Febr. | 19th 1984 | 0800-1200 UTC |
| 2nd part: | Saturday | April | 14th 1984 | 1200-1600 UTC |
| 3rd part: | Sunday   | June  | 10th 1984 | 0700-1100 UTC |
| 4th part: | Saturday | Aug.  | 25th 1984 | 1200-1600 UTC |
| 5th part: | Sunday   | Oct.  | 14th 1984 | 0800-1200 UTC |

**Bands:** 80 and 40 m VHF: 2 m and 70 cm

**Contest call:** CQ GARTG contest. After each QSO the station having called last keeps the QRG. The previous holder should make QS.

**Exchange:** Shortwave: RST, QSO-number, name, QTH  
VHF: Same as shortwave in addition QTH-locator

**Scoring:** Each station may be worked once per band. Each complete QSO counts 1 point on 80 and 40 m. VHF: Each complete QSO on 2 m and 70 cm counts 1 point per kilometre worked. Contacts via repeaters are **not** valid! Final score: Total of QSO-points

### Classifications:

- Class A: Shortwave stations with more than 200 W input
- Class B: Shortwave stations with up to 200W input
- Class C: SWL stations
- Class D: VHF stations

### Logs:

To contain:  
a) Call, name and complete address; b) Classification;  
c) Time in UTC, Call, name, QTH station worked, transmitted and received message numbers, band used; d) Final score (logs without final score will count as checklogs)  
VHF: a) to d) same as shortwave, e) QTH-locator sent and received. SWL: For points and scoring confirm above. The same stations may be reported only two times. Instead of message received, the SWL should report Call of partnerstation (worked).

**Results:** The result will be published in the GARTG newsbulletin RTTY-NEWS and in our club magazine „RTTY“ which can be bought even outside DL for 50 DM. Please contact GARTG Contest Manager.

**Logs** to be received **not** later than 20 days after closing each single contest.

**Contest-Manager:** Wolfgang Puenjer, DL 8 VX, P.O.Box 90 11 30, D-2100 Hamburg 90, Republique Federale d'Allemagne

## Fifth world wide GARTG-SSTV-Contest 1984

To promote SSTV mode the German Amateur Radio Teleprinter Group sponsors on the occasion of their 14th anniversary their fifth world wide Slow Scan Television Contest.

### When:

1st part: Saturday/Sunday 7th/8th April 1984 0600-0600 UTC  
2nd part: Saturday/Sunday 6th/7th Oct. 1984 0600-0600 UTC  
A 6 hour non operating time must be taken at any time during the contest.

**Bands:** 3,5 – 7,0 – 14,0 – 21,0 and 28 MHz amateur bands

**Messages:** a) Callsign b) RST c) Message number (three figure group starting with 001) d) GARTG-members have to transmit their membership number (a five figure group) which will give 50 bonus-points for each contact with GARTG-members.  
Contest exchange must be made exclusively in the SSTV mode. For USA and some other countries the FCC rules are accepted.

**Scoring:** All two-way SSTV contacts 80-20 m: 1 point  
All two-way SSTV contacts 15 m: 2 points  
All two-way SSTV contacts 10 m: 5 points

**Multipliers:** Each country of WAE and ARRL-list including KL 7, KH 6, W/K, JA, PY, VE/VO and VK-districts will be considered as separate countries. The same continents and countries are only valid once on each band. The same station can only be worked on each band.

**Final scoring:** QSO-points X countries worked X continents + total number of bonus points.

**Groups:** a) SSSTV transmitting and receiving stations  
b) SST receiving stations (SWL) – rules as listed above. There will be separate categories for operators and SWL.

**Logs:** Logs to contain: Date, time (UTC), call sign of station worked, RST and message number sent, time, RST and number received and points claimed. Don't forget to list the GARTG membership numbers as bonus points!

**Note:** Logs from SWL must contain both the full report sent and received by the station logged. Incomplete logging are not eligible for scoring. The summary sheet should show the full scoring. Please use separate sheet for each band.

**Deadline:** All logs must be received two months after each part.

**Contest-Manager:** Wolfgang Puenjer, DL8VX, P.O.Box 90 11 30, D-2100 Hamburg 90, Federal Republic of Germany.

**Prizes:** A free 12 month subscription of „RTTY“ – official organ of GARTG – will be sent to the 3 top scorers of group A.



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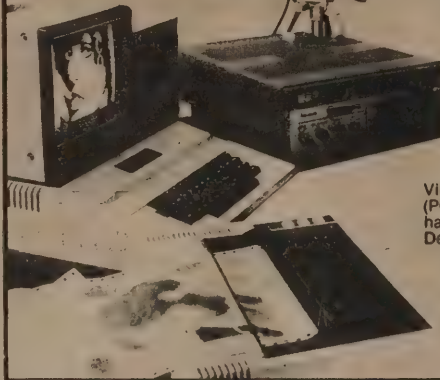
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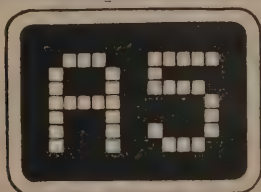
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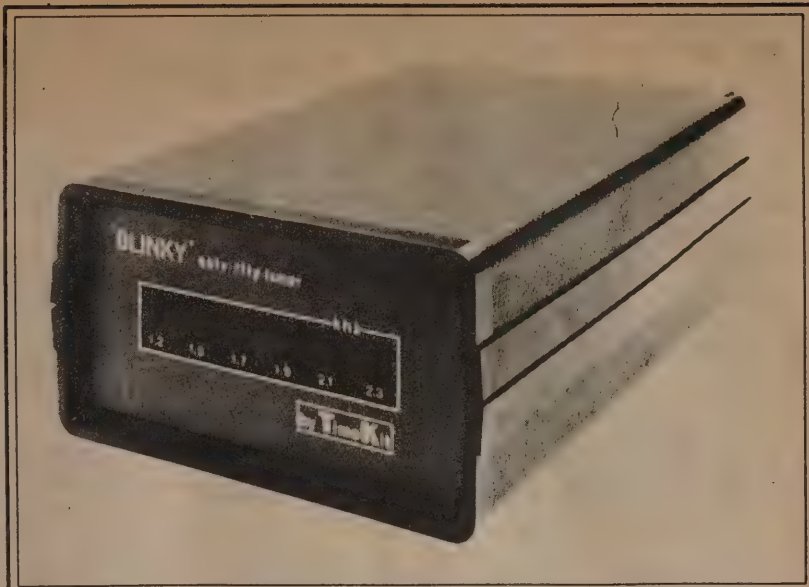
(Thanks JE1DDT for the photograph)





**THE W8ASF**  
**"BLINKY TUNER"**  
 by Timekit  
**"A5" Review**

by WB0QCD



**"Blinky" SSTV-RTTY-FAX Tuner by W8ASF**

"A5" was the first to cover news of Fred Sharp's (W8ASF) new "BLINKY" SSTV/RTTY/FAX Tuning Aide with a short article in our April 1983 Volume 13 #4 issue. Since that time, Fred has shipped quite a number of them and we have yet to hear of any complaints against them. Recently, we purchased one of the "BLINKY" units to eventually pass on to the winner of our 1984 January W.A.S. SSTV Contest (WB0UNB). While it was residing here momentarily, I couldn't resist taking a look at it.

My first initial impression was that it was so small. The advertised photographs make the unit appear bigger than it really is. Of course, the ads also point out it's 2" x 3" x 5" size. The BLINKY TUNER is housed in a rugged black plastic casing and weighs little. It is very attractively styled and a nice addition to place on or near your SSTV/RTTY or FAX converter. The digital readout area on the front of the cabinet is a "semi-frosted" red with rear-mounted LED tuning indicators that displays actual received tones. A very professional silk-screening job has been done on the front panel of the unit. It is a fully assembled and ready to plug in and operate device-not a kit.

A simple 1/8 inch barrel plug jack is used to obtain the Fed incoming audio signal with a similar size plug used for the optional 10-16 vdc. "wall adapter" power supply (Model 60 at \$9.95). Once interfaced, the unit allows the operator to correctly tune in SLOW-SCAN TELEVISION, RADIOTELETYPE or FACSIMILE transmission signals. The BLINKY is made up of amplifier/limiter stage which feeds into 6 tuned and temperature-stabilized operational amp. filters. The output of this filtering network drives an LED driver circuit which then displays the final achieved results on the Flashing and "blinking" LED indicators.

We used the W8ASF BLINKY TUNER on a piece of ROBOT 400 SSTV gear loaned by KW0Y, our own VOLKER WRAASE SC-422A and SC-1 Converter (which already incorporates a similar LED tuning design) and with a HAL ST-6K RTTY Terminal Unit. The tuning seemed most needed on trying to receive FAX signals correctly. It is difficult without some sort of tuning aide to align on the needed FAX-SYNC tones. With W8ASF's BLINKY, it tuned with a breeze. On SSTV, we are so use to hearing correct SSTV tones on SSB that any good SSTV'er should be able to accomplish it blindfolded. The difference comes in when you can actually start video printing of an SSTV picture but still be off by a few grey-shades not knowing just what the other operator is sending. BLINKY comes to the rescue correctly aligning a 1500-2300 hz range tone

window. On RTTY, the standard 170hz shift tones of 2125hz. MARK and 2295 Space tune precisely and quickly with BLINKY. We Fed audio from our YAESU FR101D HF receiver into the BLINKY TUNER as well as to our newly released "COCORTTY" TRS80C interfaceless software program and it copied great TTY signals. We like it so much, that we mention the TIME-KIT BLINKY TUNER in our supplied documentation sent with the "COCORTTY" program.

For \$99.95 (+ \$9.95 for the Model 60 Power Supply adapter), it is a welcome addition to any Specialized Communicator's Ham-Shack. It is simple to hook up and operate. When compared to the larger, more cumbersome oscilloscope or expensive LED "cross" display type equipment, BLINKY is a real bargain.

Fred Sharp's (W8ASF) BLINKY SSTV/RTTY/FAX TUNER rates A1 with "A5"- WB0QCD. For more information or ordering, write TIME KIT at P.O. Box 22277, Cleveland, Ohio 44122.

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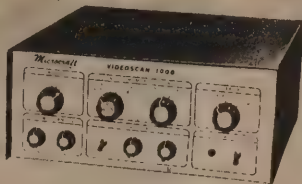


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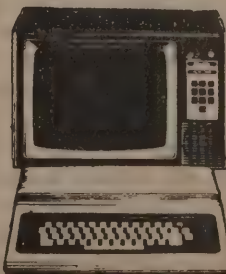
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### SLOSCAN 1.1

16K machine language software from WBMBD. Receives SSTV pictures at 8, 17, or 25 second frame rates. Menu driven, low resolution 64x128 with 7 shades of grey. Uses audio cassette port. Pictures may be saved using "SAVE IT" utility program (supplied) and hard copied on Radio Shack GCP-115, NEC or Prowriter printers. A5 special "SHOWTIME" utility automatically loads & displays up to 22 pictures off disk. A great beginning slow-scan television program. Now with actual SSTV "Demo" segments!

Disk Version  
Includes A1 3  
Programs Plus 18  
SSTV Pictures.



### COCORTTY 1.0

This unique machine language program copies and transmits standard 45.45 60 wpm. Raudot radioteletype signals. Uses audio cassette port. Text scrolls at bottom of screen (from right to left) with up to a 16 line, 512 character screen display. Keyboard controlled AFSK with a special CW/RTTY customized identifier "user friendly" program utility called MESSAGE GENERATOR, opening INSTRU program and RTTY DEMO sequence included on taped versions. Can be used as a silent video display for hardcopy RTTY demodulator systems.

### AVAILABLE AT

"A5" BOOTH #279

"SLOSCAN" or "COCORTTY"

Cassette Versions

\$24.95

Both now include extra utility programs, documentation and taped demonstration segments.

### DISK VERSIONS

\$29.95

Please add \$1.50 postage/handling

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# OFFICIAL RESULTS OF THE 1984 "A5 MAGAZINE" WORKED ALL STATES SSTV CONTEST HELD JAN. 20-22nd!

Worked All States SSTV Contest, sponsored by A5ATV, from 2300Z Jan. 20 until 2300Z Jan. 22. Work as many different states (U.S.) as possible on the video mode. All QSOs must be in video form, with a minimum of call sign and RSV signal reports sent and received. Score 10 points per SSTV QSO, 100 points for "new" states and 500 points for SSTV QSOs with Alaska or Hawaii. Send logs to Contest Manager, c/o A5 ATV, P.O. Box H, Lowden, IA 52255.

The competition is over and the official results are now in. The 1984 "A5 ATV MAGAZINE" WORKED-ALL-STATES SSTV CONTEST is history! Thirty-seven contest log entries were submitted by the deadline date, many with colored in W.A.S. MAPS (provided in our January issue). All logs have been "A5" investigated with many "cross checked" for accuracy and then returned to their owners. As promised, all entries submitted received GOLD ENDORSED CERTIFICATES suitable for framing. If by chance, you did indeed work the contest in January-but for some reason did not send in your logbook entry, do it now and we will return one of the beautiful certificates to you (contest participation void, however).

## SSTV contest V.S. Superbowl!

We received alot of very constructive comments as we did last year which always means even a better contest for the next year. The extra allotted time period on Friday seemed to give a head start to most with the majority of activity on Saturday morning/afternoon and Sunday morning. Even the annual SUPER BOWL FOOTBALL GAME late Sunday afternoon didn't appear to slow down the "more competitive" SSTV contesters. Next year, we'll manage to go around that weekend for you football buffs.

## WBOUMB wins 1st place!

Enough of the suspense, let's get down to the winners! We kind of had a sneaky hunch that WBOUMB Garnet "Beb" Bebermyer of St. Louis would be going at it "HOT & HEAVY" right from the start. And "go at it", did he ever! WBOUMB placed FIRST in the "A5" W.A.S. SSTV CONTEST with a total of 3,630 points! Beb's submitted W.A.S. Log Map looks more colored than not which made it much easier to recognize just what was and was not needed during the contest periods. Beb worked 28 States (X100) with 83 (X10) on-the-air two way SSTV contacts. States worked by WBOUMB were (log order) ID, TX, NC, MO, CA, CO, VA, NY, LA, ME, FL, NJ, MN, NI, MA, PA, NH, UT, AZ, MD and OH. 7 States were worked again but on different bands which is permissible. WBOUMB worked all available HF bands 10-15-20-40 & 80 Meters. He had two contacts on 40 Meters; WB1ZX, KD4HI and 2 on 80 Meters; WB5UZS and WB1ZX. He even worked three Canadian SSTV'ers; VE3EKA, VE6SL and VE3NW as well as popular South African Slow-Scanner ZS6BTD and New Zealand's ZL1ARY! As announced, WBOUMB will be presented a BRAND NEW TIMEKIT "BLINKY" SSTV/RTTY/FAX TUNER, valued at \$99.00. This award will be officially presented this year at DAYTON (Friday night SSTV Experimenter's get-together) by Fred Sharp WB8SF and Mike Stone WB9QCD. WBOUMB placed 3rd in our 1982 Contest. Congratulations Beb on a job well done!



A5 NEWS RELEASE

The SECOND PLACE finisher to the 1984 "A5" W.A.S. SSTV Contest went to the "Voice of Idaho" Don Muth K6KUF/7 of Hagerman. Don completed 56 individual SSTV contacts covering 27 states. His total score was an impressive 3,260 points-not far behind WBOUMB. It appeared from Don's long, computerized logsheet, that the rarest contact made during the contest was a hard to find station in the country of Iowa (WB0QCD). Congratulations Don on achieving 2nd place! Go after Beb in 1985!

## Last year's winner 3rd...

After a late start, our THIRD PLACE winner was last year's champion: Dave Daniel KB6WP of Menlo Park, California. Dave uses his APPLE/COMSOFT SSTV system and also sent in a computerized logsheet form. KB6WP worked 28 New States, 43 SSTV Contacts with a total score of 3,230 points (just 3 contacts behind K6KUF/7). Don's neatest contact came from Carlos KP4YD in Arecibo, Puerto Rico. Okay, we'll allow that one for 110! The big question is whether or not "Howard Nurse" can be content for an entire year with 3rd place? He could be seen at Dayton 1983 with the "biggest" smile on his face at KB6WP's first place finish on his Apple system! Dave adds; "Just a few lines to thank 'A5 MAGAZINE' for the opportunity to contest via the SSTV mode. It looks as though it will be a close one with WBOUMB, K6KUF, WA0PFP and K0JTZ operating along with a few "dark horses". It was fun and enjoyable, although I wish the SUPER BOWL Committee had chosen another, non-conflicting weekend! Keep it alive in 85!" -KB6WP.

## Thanks to all!

Thanks to all of you that worked or gave points during the contest. Some of those heard or worked here in the midwest; K6KUF, WBOUMB, KB6WP, K2ODC, WA0PFP, WD5BST, N5CST, WB5UZS, W4FAX, VE3EKA, K4T6C, WB1ZX, WB6QWC, W6FVV, WB5DTW, WA5IMC, W6K2L, W47W00, K5K06, KA6CDK, KC8OR, K4JNH, W0K2T, W7LEN, WB3APB, W4W1, W6SFI, W0LMD, K4KUG, K6AEP, KB6OL, WB6RIY, KD6AW, N5AXN, VE6SL, K2FW, N4EJI, A680, N7QM, W9L1I, K2ODC, KC8OR, K09T, W5ZR and many others that space just doesn't allow us to list. Special "thanks" to Brooks Kendall W1JKF and Juan NJ4E for QRX'ing the regular Saturday and Sunday SSTV Nets in lieu of the contest. -QCD

## 1984 "A5" W.A.S. SSTV CONTEST TOP FIVE FINISHERS!

| PLACE | CALLSIGN | STATES | CONTACTS | POINTS |
|-------|----------|--------|----------|--------|
| 1st   | WBOUMB   | 28     | 83       | 3,630  |
| 2nd   | K6KUF    | 27     | 56       | 3,260  |
| 3rd   | KB6WP    | 28     | 43       | 3,230  |
| 4th   | WA0PFP   | 23     | 62       | 2,920  |
| 5th   | K2ODC    | 20     | 34       | 2,340  |

37 Total Entries



# FIRST "FAX" SOFTWARE SHIPPED BY ABRAMS K6AEP FOR TRS80C\*

Ralph Taggart WB8DQT, Bob Wilson WB0RTM to  
handle "interface" requirements

It is interesting to note, that over 2 years ago (in our March 82 issue, Volume 12 #3) a big announcement was reported in that the F.C.C. had surprisingly approved (a once thought dead proposal) SSTV A5/F5 and FAX A4/F4 transmissions on all HF General license phone portions of the Amateur bands. This came about as direct proposals from "A5's" Henry Ruh KB9FO (SSTV) and Chicago's Robert Roehrig K9EVI. Since that time, a few hearty souls began to generate interest and develop Amateur FAX systems for those whose interest seems to be moving in the direction of high resolution, excellently detailed, quality over-the-air pictures. Volker Wraase DL2RZ from Germany was the first to develop FAX only Amateur video converters in 1982 and would show up at Dayton 1983 with a very attractive and unique combination SSTV/FAX Converter called the SC-1 (see March 84 issue or "A5" ad on inside back cover). Gerald Gore WB5TXA and Robert Stinson of Stinson Interfaces teamed up to manufacture a TRS80C\* Add-on FAX unit backed up by a number of WIRE/PHOTO, SWL, NOAA, WEFAX and other related software. (see Hot CoCo Review February 1984 issue in our March 84 issue Volume 14 #3). About that same time, Wayne Gorton N7QM decided to build all kinds of SSTV and FAX interface "magic boxes" for the increasing popular Radio Shack TRS80C\* Color Computer. N7QM's interfaces (as with Gore's) are completely "ready to go" direct from the factory.

Clay Abrams K6AEP, better known as the first Amateur Radio software developer for the SWTP-6800 and TRS80C\* Computers, continued also developing some outstanding software products for CW/RTTY and SSTV modes. Clay's 7.6 SSTV program, teamed up with built up interfaces from either Multinode, Dynamic Specialties, RTM Circuit Boards or AG80 Enterprises, offers very flexible operating capabilities for the TRS80C\* owner.

While the quality of software support programming has increased, the price of the TRS80C Color Computer with 64K chips has significantly "decreased". In a split 2-part article (January and March 82), K6AEP mentioned of discount firms selling the TRS80C\* for under \$310.00. Today in 1984, the Color Computer can be purchased in the Radio Shack Stores for \$159.00 and even less if you shop around. Many who already have went Abrams/TRS80C\* route, can now be treated to yet another phase of Amateur Visual Specialized Communications; FAX AND THE TRS80C!

At last your TRS-80C\* can be used to display FAX pictures conjunction with the high resolution boards described in the SSTV 7.6 program description. The program supports all modes of FAX reception which includes both HF and VHF FAX. The program supports reception of the following modes GEOS, NOAA, TIROS, APT, METEOR WEFAX or HF FAX. The program supports the two hardware configurations of the high resolution display board of 256 pixels on 128 lines (16K) or 256 pixels on 256 lines (32K). Included with the program are schematics of all interfaces. For reception of FM FAX, a SSTV receive front end may be used. All WEFAX



reception requires the use of a AM FAX front end. Both front ends are available from RTM Circuit Boards, 205 Elm St., Van Horn, Iowa 52346-8400. The program requires a TRS-80C with 64K RAM. Received WEFAX pictures from NOAA have resolution equal to or better than hard copy pictures printed on a FAX hard copy machine. The program has the following features. (1). Receive black and white FAX with resolutions of 256 pixels per line on 128 or 256 lines with 16 gray levels. All modes can be received at rates of 120 or 240 lines per minute. Other speeds are easily programmable and will be updated at a later time. (2). Display FAX pictures in color similar to those shown on TV NEWS. The pictures are converted from BW FAX and displayed on the high resolution board. Two color formats are possible. Color substitutions may be changed to allow for individual taste. (3). Interface Test. The program includes an interface test similar to SSTV 7.6 for the check out of all interfaces. (4) Low Density FAX. A built in special mode allows for reception of FAX images on the TRS-80C with no display interface card installed. The display is on the TV set attached to the TRS-80C. The resolution is very poor and is included for test purposes only. (5). Contrast Enhancement. An image enhancement mode of video processing is included in the program to add contrast to FAX pictures. This technique is useful for viewing IR pictures from NOAA satellites. (6). Picture Printing. Two modes of picture printing are possible, Epson printer or FAX printer. The Epson printing is similar to SSTV picture printing. The FAX mode allows for pictures to be printed by FAX printer like the one described in the New Weather Satellite Handbook by Ralph Taggart. (7). SSTV Transmission. Two modes of black and white SSTV transmission and reception are available with this program. These format are compatible with all SSTV equipment. WEFAX pictures can be transmitted by this mode. (8). FAX Transmission. A special mode of FM FAX transmission is supported by this program. This mode is at a rate of 120 lines per minute.

FOR MORE INFORMATION WRITE:

1785 COMSTOCK LANE  
SAN JOSE, CALIF. 95124



# NEW TRS80C\* "COCORTTY" PROGRAM RELEASED

**"INTERFACELESS" MACHINE LANGUAGE SOFTWARE COPIES AND TRANSMITS 60 W.P.M. BAUDOT RADIOTELETYPE!**

Keeping in the tradition of providing low-cost, simple TRS80C\* Amateur Radio Communication software programs that require absolutely NO INTERFACE (other than a single audio feed wire), we proudly announce a new addition to our line called "COCORTTY" by WAPSIWARE (C) 1984 (QMS #101).

"COCORTTY" is a machine language program that actually copies (and transmits) standard 45.45 baud BAUDOT Radio teletype signals (60 W.P.M.) at 170hz. shift using a 2125hz. mark and 2295hz. space signals. Once properly tuned, the radioteletype data information is regenerated into video display form and printed right on your TV screen! As the RTTY information enters the COCO microprocessor, it immediately scrolls in a right to left direction on the TV monitor up to a total of 32 easy to read characters. Once a full line has been displayed, the old text gives way to the newer incoming "active" text with a special "buffer-type" upward scroll technique. Total readable message text is 16 lines by 32 characters per line or a maximum total viewed 512 characters displayed. Audio can be heard, for ease of tuning, thru the TV set if the volume is turned up. It is an excellent computer communication program for the Shortwave "COCORTTY" Radio enthusiast!

Amateur Radio Teletype signals can be found just above the CW Morse Code segments of each band. Perhaps the most popular segment is from 14.075Mhz. to 14.100Mhz. The SSB mode is most popular with LSB tuning mode required for most signals. Keep in mind, that there are several different varying RTTY speeds and shift options as well as other types of similar yet differently formatted type signals such as ASCII and AMTOR. The "COCORTTY" software program only copies the most popular 60 W.P.M. 170hz. shift speed. If you can't print a certain type monitored signal, just move on to copy another as it probably is one of the other type of signals. Some Commercial RTTY signals can be copied as well located outside the Amateur Radio bands. Many local community "Hams" transmit RTTY on VHF frequencies as well as the international "HF" bands. Frequencies of operation will vary from area to area and many times state to state. The most popular organized VHF RTTY frequency is 146.700Mhz. FM. This FM frequency is within the range of many "scanner" radios and can be "programmed in" to monitor. Some RTTY signals even exist on Microwave frequencies, especially found on TVRO feeds on audio subcarrier signals. Special 60 W.P.M. 170hz Shift RTTY Bulletins are on each evening at 6 P.M., 9 P.M. and 12 P.M. E.S.T. originating from ARRL Headquarters in Newington, Conn. under the Amateur Radio callsign W1AW. The frequencies of the informational QST Bulletin are 3.625, 7.095, 14.095, 21.095, 28.095 and 147.555 Mhz. The possibilities of reception are endless.

**BEGINNER'S PROGRAM  
EVEN HAS CW/RTTY  
ID-MESSAGE  
GENERATOR AND  
AFSK OUTPUT...**



Tuning any RTTY signal, especially on SSB modes of reception, must be done very carefully. To tune in the desired RTTY station, using the "COCORTTY" software program, simply tune slowly until the message begins to scroll across the screen. Slight retuning may be necessary for correctly printed text. The use of an oscilloscope meter, LED, or other tuning aid indicators (such as the WBAF BLINKY TUNER) would greatly enhance ease of tuning requirements. Audio hookup can be accomplished by running a two conductor, shielded line from the receiving device's "earphone" or "external speaker" jack output. The TRS80C\* Pin 2 Audio Cassette line is used to enter the incoming Audio signal into the computer. The simplest way to do this is to use a double jumper Y-feed cable or jack on the (black) earphone input jack receptacle on the Radio Shack COCO's CCR-81 recorder. If you are already using the "SLOSCAN" (QMS-100) "interfaceless" program, you may of course use the same line- just load the programs and enjoy. The CCR-81 unit itself, can be used in recording RTTY Audio signals on tape for later viewed replays.

Operation of "COCORTTY" has been kept as simple as possible. Once automatically executed, "COCORTTY" goes into (R) RECEIVE mode condition. Turn up the volume on your TV set to hear the audio coming from your receiver. PRESSING of the UP ARROW KEY activates the (pre-programmed) CW ID sequence (Remember to turn on your transmitter before doing this) and initiates the (S) SEND Transmit mode. Simply type in your RTTY message using the TRS80C\* Keyboard. Type slowly as "COCORTTY" contains no actual buffered buildup memory and you should not enter the next letter until the previously selected 5 level Baudot Coded Character is fully transmitted. Once your message text has been completed, PRESS the DOWN ARROW Key on the TRS80C\* Keyboard. Your (pre-programmed) RTTY IDENTIFIER message will be sent. Upon completion of this phase, "COCORTTY" automatically CW ID's and goes back in (R) RECEIVE mode condition. It couldn't be simpler!

A special basic language "INSTRUC" (C)LOAD instruction program is provided at the beginning of the taped cassette version which is pretty unique in itself, as it is styled in the "COCORTTY" display format telling the user about the special keyboard mode control command functions. Once the user is familiar with the "INSTRUC" program, (C)LOADING of



an additional MESSAGE GENERATOR (MSG GEN) program inserts up to a 30 character RTTY message buffer and up to a 10 character CW-ID memory buffer. The screen "counts down" characters inserted into these RTTY and CW buffers with actual results displayed upon command of the UP and DOWN Keyboard arrow keys. NOTE: Once set, stored messages cannot be changed without reloading the entire MSG GEN program. The MESSAGE GENERATOR utility automatically (C)LOADS and self-executes the main machine language "COCORTTY" program.

A "menu-driven" special feature has been built into the "MSG GEN" utility program that allows (if desired by the COCORTTY operator) the final formatted CW ID Callsign and RTTY Buffered Message Generator information to be (C)SAVED to another tape or disk. This eliminates going thru the INSTRUC or MSG GEN sequences again and again each time you want to use the program. This "new" program is stored as "MYRTTY" (which can be retitled if so desired using the COCO's "RENAME" command statement). IT IS IMPORTANT TO NOTE THAT THIS OPTION OCCURS IMMEDIATELY UPON EXECUTION OF THE "YES" STATEMENT AND A NEW CASSETTE OR FORMATTED DISK SHOULD BE INSERTED BEFORE EXECUTING THIS STATEMENT, ELSE THE PROGRAM WILL TRY TO BE WRITTEN TO THE CASSETTE OR DISK THAT CARRIES THE "COCORTTY" PROGRAMS.

Immediately following the 3 (INSTRUC, MSG GEN and COCORTTY) provided programs, is a lengthy Baudot 60 W.P.M. RTTY "DEMO" sequence. This can be sent into the COCO systems while in the "R" RECEIVE mode condition by simply pressing the PLAY button on the cassette recorder and removing the MOTOR CONTROL plug from the CCR-81 recorder's socket. Recording actual "off-the-air" RTTY signals stored to tape can be done using this method using the PAUSE CONTROL until properly tuned video is printed on the screen via the "COCORTTY" program. PROCEDURE FOR LOADING; (C)LOAD, RUN (INSTRUCTION PROGRAM), (C)LOAD, RUN (MESSAGE/ID GENERATOR PROGRAM) which automatically loads and executes the main (COCORTTY) program, DEPRESS PLAY BUTTON while customizing message and callsign ID) operate the "COCORTTY" program and finally PRESS the PLAY CASSETTE BUTTON and REMOVE the MOTOR CONTROL PLUG for receiving the (R) RTTY DEMO test sequence.

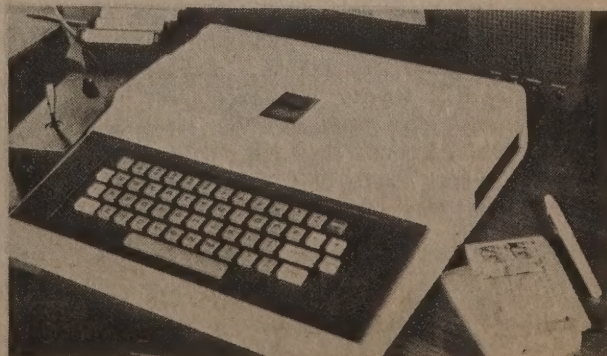
SEND (S) Although designed primarily for the reception and display of RTTY signals, the "COCORTTY" software program can also be used for sending a RTTY signal as well. Simple feeding of the audio emitted from the TV Set's speaker or outgoing audio line is sufficient (if properly matched) to drive an AFSK signal into the transitter's microphone input circuit. If a RTTY TV DEMODULATOR is available, the sending of the AFSK audio signal into the AFSK input on the terminal unit will regenerate to a "perfect" RTTY output signal. There is a "buzzing" type of sound emitted for the TRS80C\* microprocessor, along with the initiated RTTY 5 level AFSK tones, which represents the steady MARK tone type signal. While somewhat objectionable to the ear, RTTY information passes without a problem. Keep in mind, that this a low-cost designed system trying to do what other hundred to thousand dollar systems accomplish.

"COCORTTY" works well on all modes (including SSB and FM) on HF or VHF RTTY. NOTE: Only F.C.C. licensed Radio Amateurs may transmit on Amateur Bands.

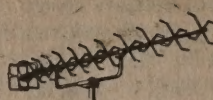
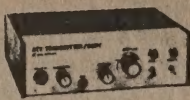
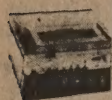
Most RTTY Radio Amateurs, already employ some sort of hardcopy TTY TU systems such as an ST-5, ST-6, Flesher TU-170 etc, type of terminal unit. This is used to drive keyed voltages to the magnets of printers such as Teletype's (TM) Model 15 or 28 series. The "COCORTTY" software program, if used with such a system (hooked to the AFSK output of the Audio line circuit), can create a unique working "video driver and display" setup. This will allow the TTY operator a selection between "hardcopy" or "silent video display" viewing.

There are several good basic books about RTTY COMMUNICATIONS that we recommend highly to newcomers; THE BEGINNERS GUIDE TO RADIOTELETYPE, a 100 page collection of RTTY articles published in booklet form by Ralph Wilson of ESF COPY SERVICE, 4011 Clearview Drive, Cedar Falls, Iowa 50613 (\$6.00 pd), BEGINNERS RTTY HANDBOOK, published by RTTY JOURNAL, P.O. Box 97, Cardiff-by-the-Sea, Calif. 92007, The NEW RTTY HANDBOOK, published by Wayne Green (73 Magazine), Peterborough, NH., an excellent brand new RTTY TODAY publication by Dave Ingram K4TWJ (135 pages) \$8.95 and a great WORLD RADIO TELETYPE FREQUENCY LIST (9th edition) by Joerg Klingenfuss, both available from UNIVERSAL ELECTRONICS, INC. 4555 Groves Road, Suite 3A, Columbus, Ohio 43232.

In conclusion, as with the earlier released "SLOSCAN 1.1" SSTV interfaceless program by W4MB0 (QMS-100), "COCORTTY" is designed to open-the-door (in beginner's fashion) to the exciting world of Radioteletype communications. It works well, is extremely simple to operate and allows yet another new mode of specialized communications in the "ham-shack". It boasts of no other fancy deeds other than to provide basic radioteletype reception and transmission at a budget price. Once committed, "COCORTTY" TRS80C\* operators can then advance into perhaps a more serious RTTY system, such as the Clay Abrams K6AEP Software programs (Send SASE). "COCORTTY" is available for just \$24.95 (Cassette version) from QCD MICRO SOFTWARE SYSTEMS, A Division of QCD PUBLICATIONS, INC., P.O. Box H, LOWDEN, IOWA 52255. Please include \$1.50 for packaging, shipping and handling.







Do you own, or did you buy, one of the unique PANASONIC model CT-1112 Color TV/Monitors from the USATVS Buying Service? If so, would you like a SERVICE MANUAL? They are now available for just \$1.50. 27 pages full of technical information on the unit including a large, easy to read, foldout schematic diagram. Ordering must be done in this method; Call (312) 364-7900 or write MATSUSHITA ENGINEERING CORP. of AMERICA, Parts Division, 425 East Algonquin Road, Arlington Heights, Ill. 60005. Ask for the PANASONIC CT-1112 SERVICE MANUAL #MX-K8D. There will be a \$2.00 shipping charge. Send no money to this location. Once received, an invoice and packing slip is included. Send \$3.50 remittance to PANASONIC COMPANY, P.O. Box 1552, Secaucus, N.J. 07094. Include your invoice with check. This applies to all brands of PANASONIC, QUASAR, TECHNICS or RAMSA electronic equipment.

DO YOU have one of the LIBERTY Model #5010 5" Color TV's sold by P.C. ELECTRONICS or more recently thru the "A5/USATVS Buying Service"? If so, how would you like to obtain a complete Service Manual-schematics and all for just \$3.50 ppd? We finally found out how to get ahold of them. Write or call; FAR EAST INTERNATIONAL, (Attention Jenny), 1044 West Grove, Orange, California, 92665 (714-921-0320). You'll have your service manual back in a few days. WB00CD

LOOKING for Video Special Effects Generator. Call Collect. Bill Boneig (NYACK ATV GROUP) (914) 628-7003. Thanks "A5"!

CLEANING OUT THE SHACK! James Thomas SSTV (ASCII) Keyboard, \$100.00. HITACHI 6P-5A Camera, Power Supply \$300.00. KLM TA 10-110 CL AMP for ATV \$110.00. 6 K2RIW 19 element (13 foot) beams with 4 way power divider (will sell one or all). ICOM IC-730 HF Mobile Rig \$500.00. Call Jack at (609) 394-3653.

ATTENTION ATV'ERS (FSTV/SSTV) programs for Your COMMODORE 64 COMPUTER! Maintaining library of VIC-20 and C64 programs for "A5"/USATVS Members. Send your list and let's swap. Tracy Munson N9AEP, RR#1 Box 214 B, Moline, Ill. 61265.

FOR SALE- Panasonic Color Monitor (CT-1310M) with SAMS diagram in like new condition \$195.00. RCA Color Cameral CC807 with ZOOM and MACRO Lense; beautiful color, includes AC Power Supply \$395.00. Kenwood Remote VFO (VFO-520S) \$65.00. Contact "A5/USATVS" Member Bill Wells W4CVS, 505 Blackmon Circle, Adamsville, Alabama 35005 or call (205) 798-0788. Thanks "A5" for the FREE AD!

HELP! Need schematic or other information on JFD Model 600 B/W CCTV Camera - Tom Workman K0TW, RT.#9 Box 688, Tucson, Arizona 85743

TRS80C COLOR COMPUTER PROGRAM PACKAGES (Cassette versions) only \$19.95. ATV Package (See February issue, Channel 37). 27 FSTV related programs and graphics, AMATEUR RADIO Pkg. (25), UTILITIES Pkg. (25), BUSINESS Pkg. (25), GAMES Pkg. (25), MUSIC Pkg. (25) and GRAPHICS Pkg. (50+). Send us your program listings for possible swaps. Contact Bud Pitt WB0MEM, 105 Clinton Ave. Muscatine, Iowa 52761. "We will be working at the "A5" booth at Dayton!"

FOR SALE OR TRADE. TC-1, 48-element J beam, Sanyo VC1600X or VC1130 with lens (your choice)- all above in good shape. Will throw in VHF Engineering peanut whistle and modulator with supply (final transistor blown), GE pre-prog xmtr, dc supply, with 439.25 xtal and modulator (never could get it to work). Interested in reasonable offer or slowscan equipment, maybe computer. Want to try something other than FSTV. All written inquiries answered. Please contact George, W4SKBH, 1604 NE 62nd St. Gladstone, MO. 64118.

FOR SALE- Robot 400 SSTV board. Just upgraded to color and have one unmodified factory fresh board to sell for \$110.00. Ray Stevens W2BYD P.O. Box 235, Wellsville, New York, 14895. Phone-716: 593-3220 days, 716: 593-4270 evenings.

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**ARE FREE TO MEMBERS!**

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